

REPORT NUMBER: 201-MGA-2003-002

**SAFETY COMPLIANCE TESTING FOR FMVSS 201
RIGID POLE SIDE IMPACT TEST**

**Volkswagen AG Germany
2003 Volkswagen Passat 4 door
NHTSA NUMBER: C35802**

**PREPARED BY:
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March 26, 2003

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW, ROOM 6111 (NVS-220)
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-01-D-01033.

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16. Abstract A rigid pole side impact test was conducted on a 2003 Volkswagen Passat 4 door in accordance with FMVSS 201, "Occupant Protection in Interior Impact", S6.1(b)(3) and the Office of Vehicle Safety Compliance Test Procedure No. TP-201P-02 "Rigid Pole Side Impact Test". The test was conducted at MGA Research Corporation in Burlington, Wisconsin on March 26, 2003. The impact velocity of the vehicle was 28.5 kph, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 21°C. The post-test maximum crush was 429 mm at level 3. The test vehicle's occupant performance is as follows: <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%; text-align: center;"><u>REQUIREMENTS</u></td> <td style="width: 33%; text-align: center;"><u>DRIVER</u></td> </tr> <tr> <td style="text-align: center;">HIC</td> <td style="text-align: center;">≤ 1000</td> <td style="text-align: center;">323</td> </tr> </table> The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.							<u>REQUIREMENTS</u>	<u>DRIVER</u>	HIC	≤ 1000	323
	<u>REQUIREMENTS</u>	<u>DRIVER</u>									
HIC	≤ 1000	323									
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SECTION 1

PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This rigid pole side impact test is conducted as part of the FY' 2003 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-01-D-01033. The purpose of this test was to evaluate occupant protection in interior impact in a 2003 Volkswagen Passat 4 door manufactured by Volkswagen AG Germany.

1.2 TEST PROCEDURE

The rigid pole side impact test was conducted in accordance with the current National Highway Traffic Safety Administration (NHTSA), Office of Vehicle Safety Compliance (OVSC), laboratory test procedure TP-201P-02, dated October 21, 2001 and the corresponding MGA Research Corporation Test Procedure MGA-NHTSA8. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

SECTION 2

SUMMARY OF RIGID POLE SIDE IMPACT TEST

2.1 SUMMARY OF RIGID POLE SIDE IMPACT TEST

A rigid pole side impact test was performed on a 2003 Volkswagen Passat 4 door. The subject vehicle was towed into a rigid pole at a velocity of 28.5 km/h. The specified impact velocity range is from 27.2 to 28.8 km/h. The test vehicle was positioned 90° to the line of forward motion. The weight of the vehicle as tested was 1735.0 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on March 26, 2003.

One (1) real-time motion picture camera and twelve (12) high-speed motion picture cameras were used to document the impact event. Camera locations and pertinent camera information are documented in the data sheets. Pre- and post-test photographs of the vehicle and SID/HIII can be found in Appendix A. One SID/HIII was placed in the left front outboard designated seating position according to instructions specified in the TP-201P-02 dated October 21, 2001. The SID/HIII was instrumented in the following locations:

- Head Center of Gravity (CG) tri-axial accelerometers (X, Y, and Z axis)
- Upper Neck 6 channel load cell (X, Y, Z force and moment)
- Left Upper Rib (LUR) uni-axial accelerometer (Y-axis primary and redundant)
- Left Lower Rib (LLR) uni-axial accelerometer (Y-axis primary and redundant)
- Lower Thoracic Spine (T12) uni-axial accelerometer (Y-axis primary and redundant)
- Pelvic (PEV) section uni-axial accelerometer (Y-axis primary and redundant)

The test vehicle was instrumented with eighteen (18) structural accelerometers. All data channels were recorded with a fully self contained on-board EME Data Acquisition System. The data was digitally sampled at 10,000 samples per second and processed per Section 12.2 of the Test Procedure.

2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 429 mm at level 3, at the vertical impact line. The driver SID/HIII, Serial No. 37, was calibrated just prior to this test. The SID/HIII's injury criteria are summarized as follows:

Measurements	Units	Driver
HIC		323
TTI*	G's	47
Pelvis*	G's	44
Neck Force X*	N	-197
Neck Force Y*	N	-329
Neck Force Z*	N	843
Neck Moment X*	Nm	-66.2
Neck Moment Y*	Nm	-18.3
Neck Moment Z*	Nm	27.4

* Information Purposes Only

Test summaries and post-test observations are presented in Section 3. The vehicle, camera, and occupant measurements are presented in Section 4. Appendix A contains the still photograph prints. Appendix B contains the SID/HIII and vehicle data traces. Appendix C contains the SID/HIII's configuration and performance verification data. Appendix D contains the test equipment information.

TEST NOTES

The following accelerometers were not used for this test:

A Pillar Upper
B Pillar Low
B Pillar Mid
B Pillar Upper
Left Roof
Right Roof

SECTION 3
SIDE IMPACT DUMMY (SID/HIII) AND VEHICLE TEST DATA

Test Vehicle: 2003 Volkswagen Passat 4 door
 Test Program: FMVSS 201P

NHTSA No. C35802
 Test Date: March 26, 2003

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	English Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressure	lb/in ²	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	$=(t_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

*Based on the Recommended Practice in SAE J916, May 85

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2003 Volkswagen Passat 4 door
 Test Program: FMVSS 201P

NHTSA No. C35802
 Test Date: March 26, 2003

TEST VEHICLE INFORMATION

Make	Volkswagen
Model	Passat
Body Style	4 door
NHTSA No.	C35802
VIN	WWWPD63B63P252141
Color	Silver
Delivery Date	1/13/03
Odometer Reading (mile)	472
Dealer	Vyletel Volkswagen
Transmission	Automatic
Final Drive	Front
Number of Cylinders	4
Engine Displacement (L)	1.8
Engine Placement	Longitudinal

TEST VEHICLE OPTIONS

Front Airbag	Yes
Side Airbags	Yes, side & curtain
Power Windows	Yes
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Air Conditioning	Yes
Power Brakes	Yes
Disc Brakes, Front	Yes
Disc Brakes, Rear	No
Anti-lock Brakes	Yes
AM/FM/CD	Yes
Anti-theft System	Yes
Cruise Control	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Volkswagen AG Germany	GWR (kg)	2030
Date of Manufacture	10/02	GAWR Front (kg)	1070
		GAWR Rear (kg)	990

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	210	273
Cold Pressure (kPa)	196	196
Recommended Tire Size	P195/65R15	P195/65R15
Tire Size on Vehicle	P195/65R15	P195/65R15
Tire Manufacturer	Continental	Continental

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Contour		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				481
Cargo Wt. (RCLW) (kg)				140.6

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2003 Volkswagen Passat 4 door NHTSA No. C35802
 Test Program: FMVSS 201P Test Date: March 26, 2003

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	454.1	296.7		492.6	362.4	
Right	kg	466.8	305.3		518.5	361.5	
Ratio	%	60.5	39.5		58.3	41.7	
Totals	kg	920.9	602.0	1522.9	1011.1	723.9	1735.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1522.9
Weight of SID/HII Side Impact Dummy	kg	80.7
Rated Cargo/Luggage Weight (RCLW)	kg	136.1
Calculated Vehicle Target Weight (TVTW)	kg	1739.7

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	Fully Loaded	Ready For Test
Right Front	mm	711	709	782*
Left Front	mm	708	700	784*
Right Rear	mm	717	681	776*
Left Rear	mm	715	674	774*
Right Door Sill Angle	deg	0.7 ND	0.0	0.1 ND
Left Door Sill Angle	deg	0.7 ND	0.0	0.2 ND
Front Bumper Angle	deg	0.3 RD	0.1 RD	0.1 RD
Rear Bumper Angle	deg	0.4 RD	0.2 RD	0.2 RD

ND = NOSE DOWN, RD = BACK DOWN, LD = LEFT DOWN, RD = RIGHT DOWN

* on wheel dollies

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2705
Total Vehicle Length at Left Side	mm	4023
Total Vehicle Length at Centerline	mm	4665
Total Vehicle Length at Right Side	mm	4023
Total Vehicle Width at B-Post	mm	1724
Weight of Ballast in Cargo Area	kg	43.1
Amount of Stoddard Solvent in Fuel Tank	liters	58.4

DATA SHEET NO. 1... (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2003 Volkswagen Passat 4 door
Test Program: FMVSS 201P

NHTSA No. C35802
Test Date: March 26, 2003

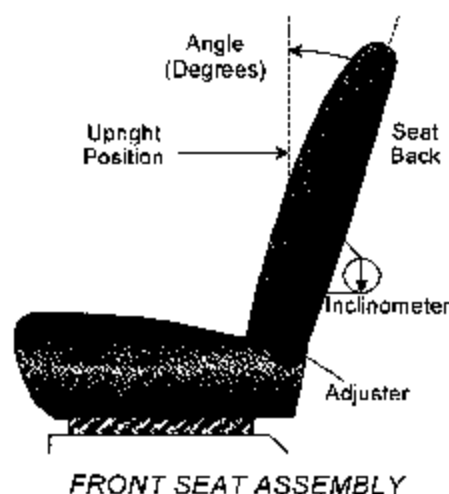
TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Target Impact Point Aft of Front Axle	mm	1373
Actual Impact Point Aft of Front Axle	mm	1370

NORMAL DESIGN RIDING POSITION

The driver's seat back is positioned to the manufacturer's designated angle. The procedure for the seat is as follows: set the seat back angle to achieve a 19 degree torso angle.

Driver seat back angle: Initial - 14.7 deg. on headrest post
Final - 13.0 deg. on headrest post



SEAT FORE/AFT POSITIONS

The fore/aft was set to the middle position for the driver's seat.

Driver seat fore/aft total travel: 14 detents

Driver seat fore/aft position: 8th detent rearward

SEAT BELT UPPER ANCHORAGE

The test vehicle is equipped with adjustable "D" ring anchorage for the driver's seat position. The driver's "D" ring anchorage was placed in the third position of five with the top position as 1.

DATA SHEET NO. 1... (continued)
TEST VEHICLE INFORMATION

Test Vehicle: 2003 Volkswagen Passat 4 door
Test Program: FMVSS 201P

NHTSA No. C35802
Test Date: March 26, 2003

FUEL TANK CAPACITY DATA

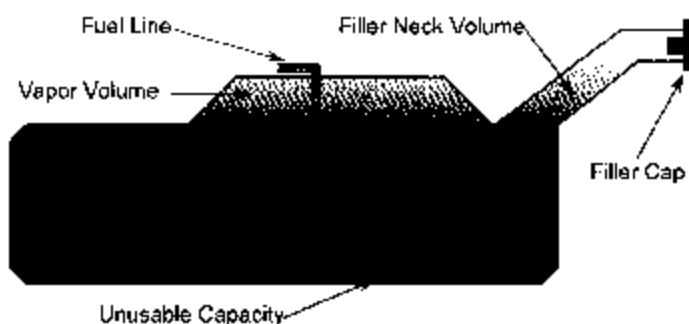
The "Usable Capacity" of the standard equipment fuel tank is: 62.1 liters

The "Usable Capacity" of any optional equipment fuel tank is: n/a liters

92-94% of "Usable Capacity" for certification to FMVSS 301 requirements: 57.1 - 58.4 liters

Actual amount of Stoddard solvent added to vehicle for certification test 58.4 liters

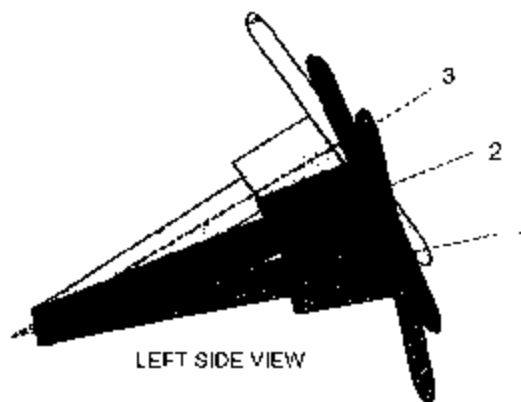
The test vehicle is equipped with an electric fuel pump. The fuel filler door is located on the right rear fender.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes, when it is moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, and inclinometer is placed onto the plate and the angle is measured.



STEERING COLUMN ASSEMBLY

Lowermost, position 1: 20.9

Geometric center, position 2: 22.3

Uppermost, position 3: 23.6

The steering column has 40 mm of fore/aft adjustment. It was set back 20 mm (at the midpoint of its range) for the test.

DATA SHEET NO. 2
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2003 Volkswagen Passat 4 door
 Test Program: FMVSS 201P

NHTSA No. C35802
 Test Date: March 26, 2003

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	454.1	296.7		492.6	362.4	
Right	kg	466.8	305.3		518.5	361.5	
Weight Ratio	%	60.5	39.5		58.3	41.7	
Totals	kg	920.9	602.0	1522.9	1011.1	723.9	1735.0

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	373	429
Level 2	Occupant H-Point	mm	424	683
Level 3	Mid Door	mm	429	721
Level 4	Window Sill	mm	392	999
Level 5	Window Top	mm	188	1455
N/A	Maximum Penetration	mm	429	721

INSTRUMENTATION

SID/HIII Instrumentation	17
Vehicle Structure Accelerometers	18
Total	35

CAMERAS

Onboard Vehicle	3
Offboard Vehicle	9
Total	12

IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	3 forward

DATA SHEET NO. 3**POST TEST OBSERVATIONS**

Test Vehicle: 2003 Volkswagen Passat 4 door
 Test Program: FMVSS 201P

NHTSA No. C35802
 Test Date: March 26, 2003

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Left Front Seating Position
Dummy Type / Serial No.	SID/HIII / 037
Head Contact	Airbag curtain
Upper Torso Contact	Side airbag
Lower Torso Contact	Side airbag
Left Knee Contact	Door trim panel
Right Knee Contact	Left knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Door Opening	Door remained closed and latched	Door remained closed and latched
Right Side Door Opening	Door remained closed and latched	Door remained closed and latched
Seat Movement	0	0
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No failures
Sill Separation	None
Windshield Damage	Cracked
Window Damage	Left side windows down for test
Other Notable Effects	None

AIRBAG DEPLOYMENT

	Driver
Front	no
Side	yes
Curtain	yes

ARMREST LOCATION AND SEAT CRUSH

	Driver
Front Armrest (from bottom of window)	273
Front Seat Back Crush	215
Front Seat Cushion Crush	60

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 4
SID/HIII INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2003 Volkswagen Passat 4 door
 Test Program: FMVSS 201P

NHTSA No. C35802
 Test Date: March 26, 2003

THORAX AND PELVIS PEAK ACCELERATIONS (FIR 100 Filtered)

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Upper Rib (LUR)	Y	G's	44.9	45	-6.9	100
Upper Rib (LUR) (R)	Y	G's	44.4	45	-6.4	101
Lower Rib (LLR)	Y	G's	47.0	46	-8.7	99
Lower Rib (LLR) (R)	Y	G's	47.0	46	-8.0	99
Lower Spine (T ₁₂)	Y	G's	46.1	42	-17.2	78
Lower Spine (T ₁₂) (R)	Y	G's	45.5	42	-17.1	78
Pelvis (PEV)	Y	G's	43.6	38	-15.1	79
Pelvis (PEV) (R)	Y	G's	43.9	39	-14.8	79

THORACIC TRAUMA INDEX (TTI) AND PELVIC ACCELERATION (FIR 100 Filtered)

Location	Driver			
	LUR	T ₁₂	TTI(g)	PEV(g)
Rib, Spine, and Pelvis	47.0	46.1	47	43.6
Rib, Spine, and Pelvis (R)	47.0	45.5	46	43.9

UPPER NECK FORCES AND MOMENTS (SAE CLASS 1000/600 Filtered)

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Neck Force	X	N	175	181	-197	83
Neck Force	Y	N	103	57	-329	170
Neck Force	Z	N	843	60	-43	26
Neck Moment	X	Nm	17.6	115	-66.2	55
Neck Moment	Y	Nm	17.0	106	-18.3	168
Neck Moment	Z	Nm	27.4	62	-7.2	175

HEAD CG PEAK ACCELERATIONS (SAE CLASS 1000 Filtered)

Location	Axis	Units	Driver			
			Max	Time	Min	Time
Head CG	X	G's	4.3	180	-15.9	65
Head CG	Y	G's	58.4	56	-7.8	170
Head CG	Z	G's	9.2	44	-12.7	62
Head CG Resultant		G's	59.5	56		

HEAD INJURY CRITERIA (SAE CLASS 1000 Filtered)

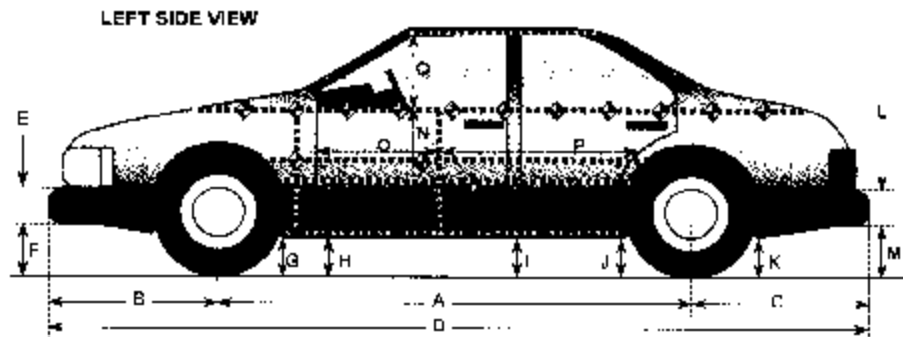
Location	Driver			
	HIC	T1	T2	Avg G's
Head CG Resultant	323	46.3	67.6	47.0

Positive Acceleration Polarities: Longitudinal (X) = + Forward
 (Conforms to SAE J211) Lateral (Y) = + Right
 Vertical (Z) = + Down

DATA SHEET NO. 5
VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2003 Volkswagen Passat 4 door
 Test Program: FMVSS 201P

NHTSA No. C35802
 Test Date: March 26, 2003



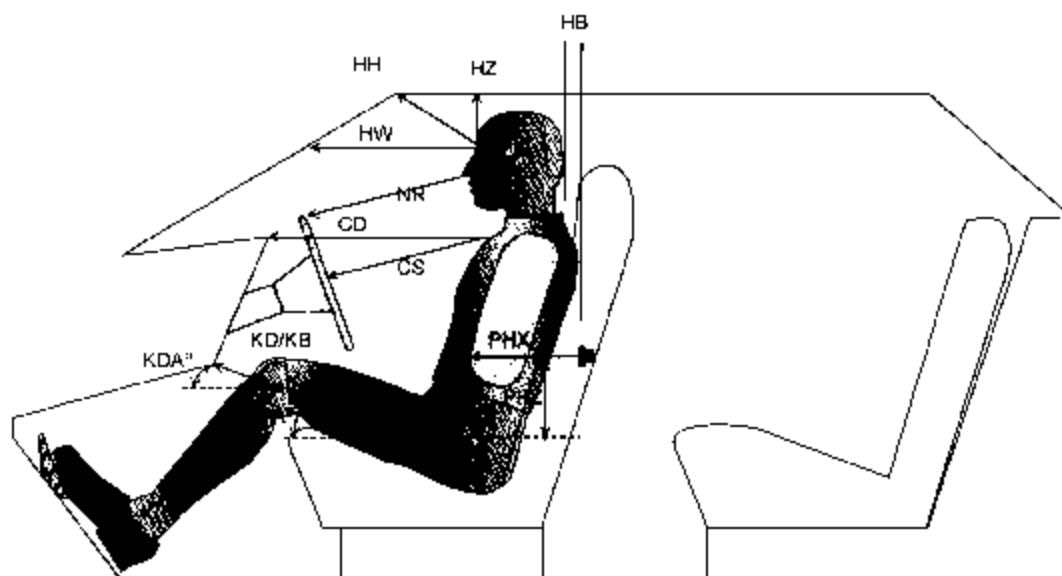
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2705	2569	136
B	Front Axle to FSOV	920	900	20
C	Rear Axle to RSOV	1040	1025	15
D	Total Length at Centerline	4665	4494	171
E	Front Bumper Thickness	175	175	0
F	Front Bumper Bottom to Ground	464	500	-36
G	Sill Height at Front Wheel Well	264	258	6
H	Sill Height at Front Door Leading Edge	262	258	4
I	Sill Height at "B" Pillar	284	283	21
J1	Sill Height at Rear Wheel Well	268	252	16
J2	Pinch Weld Height at Rear Wheel Well	270	252	18
K	Sill Height Aft of Rear Wheel Well	277	249	28
L	Rear Bumper Thickness	227	227	0
M	Rear Bumper Bottom to Ground	486	435	51
N	Sill Height to Window Bottom Sill	642	638	4
O	Front Door Leading Edge to Impact CL	920	911	9
P	Rear Door Trailing Edge to Impact CL	1010	972	38
Q	Front Window Opening	474	468	6
R	Right Side Length	4023	4050	-27
S	Left Side Length	4023	3886	137
T	Vehicle Width at "B" Post	1724	1463	261

DATA SHEET NO. 6
SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2003 Volkswagen Passat 4 door
 Test Program: FMVSS 201P

NHTSA No. C35802
 Test Date: March 26, 2003

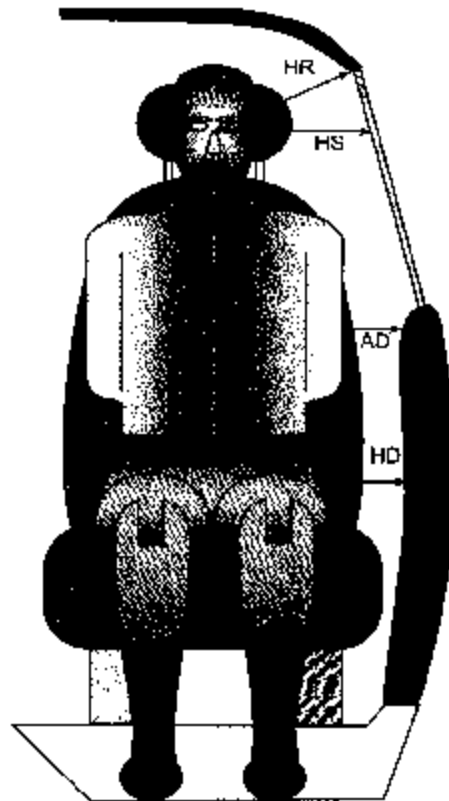


Driver Code	Measurement Description	Driver	
		Length(mm)	Angle(°)
HB	Back of Head to Back of Window @ Head CG	52	
HH	Head to Header	361	
HW	Head to Windshield	567	
HZ	Head to Roof	181	
NR	Nose to Rim	402	
CD	Chest to Dash	490	
CS	Chest to Steering Wheel	319	
KDL	Left Knee to Dash	240	0
KDR	Right Knee to Dash	240	0
PA	Pelvic Angle		24.1
PHX	H-Point to Striker (X-Axis)	203	
PHZ	H-Point to Striker (Z-Axis)	208	

DATA SHEET NO. 7
SID/IIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2003 Volkswagen Passat 4 door
Test Program: FMVSS 201P

NHTSA No. C35802
Test Date: March 26, 2003



FRONT VIEW OF DUMMY

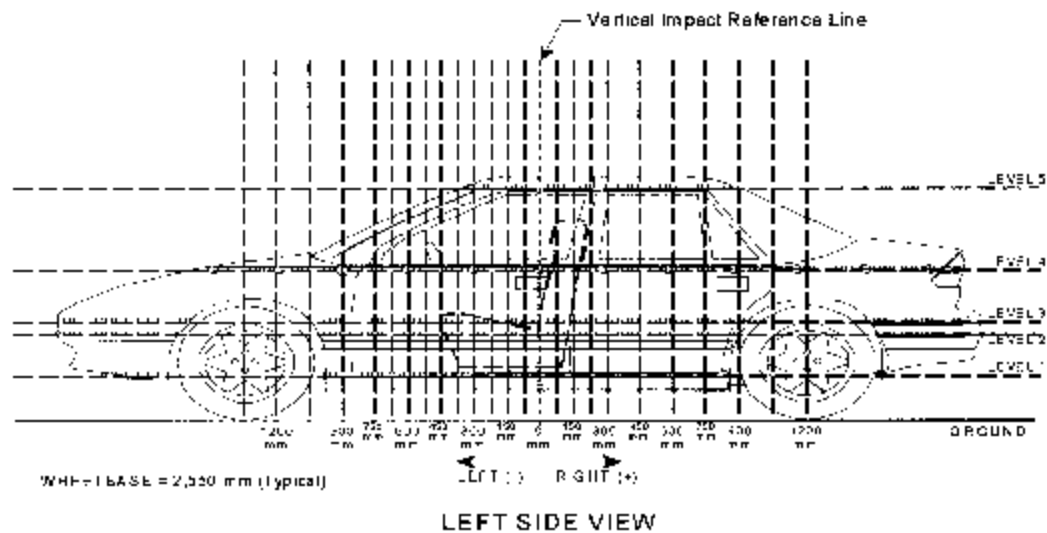
Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	103
HS	Head to Side Window	mm	246
AD	Arm to Door	mm	117
HD	H-Point to Door	mm	151

DATA SHEET NO. 8
VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2003 Volkswagen Passat 4 door
 Test Program: FMVSS 201P

NHTSA No. C35802
 Test Date: March 26, 2003

PRETEST AND POST TEST EXTERIOR PROFILE MEASUREMENTS



Measurements are taken with vehicle in the as tested condition.
 Measurements along the vertical 0 mm.

Level	Measurement Description	Units	Height Above Ground
5	Window	mm	1455
4	Window Sill	mm	999
3	Mid Door	mm	721
2	Occupant H-Point	mm	683
1	Sill Top	mm	429

DATA SHEET NO. 9
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2003 Volkswagen Passat 4 door
Test Program: FMVSS 201P

NHTSA No. C35802
Test Date: March 26, 2003

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1950				382					308					-74	
-1800				321					304					-17	
-1650				364					309					-55	
-1500				350					311					-39	
-1350				345					312					-33	
-1200				335					317					-18	
-1050		237	245	324			245	250	317			8	5	-7	
-900	282	247	247	315		299	257	255	317		17	10	8	2	
-825	281	245	245	310		324	297	290	331		43	52	45	21	
-750	280	244	243	306		345	335	329	350		65	91	86	44	
-675	279	242	241	302		368	370	366	368		89	128	125	66	
-600	278	241	240	300		392	408	402	403		114	167	162	103	
-525	277	239	238	298		416	445	439	438		139	206	201	140	
-450	277	239	238	294		443	480	472	470		166	241	234	176	
-375	276	238	237	293		469	515	505	506		193	277	268	213	
-300	275	238	237	289	563	496	548	537	540	615	221	310	300	251	52
-225	275	238	237	289	550	534	581	570	576	640	259	343	333	287	90
-150	275	237	237	287	543	588	610	603	613	651	313	373	366	326	108
-75	274	237	237	285	535	631	639	640	656	692	357	402	403	371	157
0	274	238	237	285	531	647	662	666	677	719	373	424	429	392	188
75	274	238	237	284	528	627	646	645	650	696	353	408	408	366	168
150	275	238	238	284	528	581	583	583	598	675	306	345	345	314	147
225	275	239	238	284	528	542	514	514	555	656	267	275	276	271	128
300	276	239	238	284	528	514	490	488	529	642	238	251	250	245	114
375	277	240	239	284	529	486	464	465	508	628	209	224	226	224	99
450	278	241	240	285	533	456	438	440	488	615	178	197	200	203	82
525	279	242	241	287	534	425	410	412	470	602	146	168	171	183	68
600	280	244	243	289	536	397	386	390	450	593	117	142	147	161	57
750	283	246	246	292	546	344	342	345	414	586	61	96	99	122	40
900	281	251	251	298	559	320	299	303	380	588	39	48	52	82	29
1050		234	243	306	582		273	280	351	609		39	37	45	27
1200			228	312				265	340				37	28	
1350				320					342					22	
1500				328					348					20	
1650				340					348					8	
1800				352					359					7	
1950				371					375					4	
2100				392					394					2	

Reference plane is parallel to test vehicle longitudinal centerline

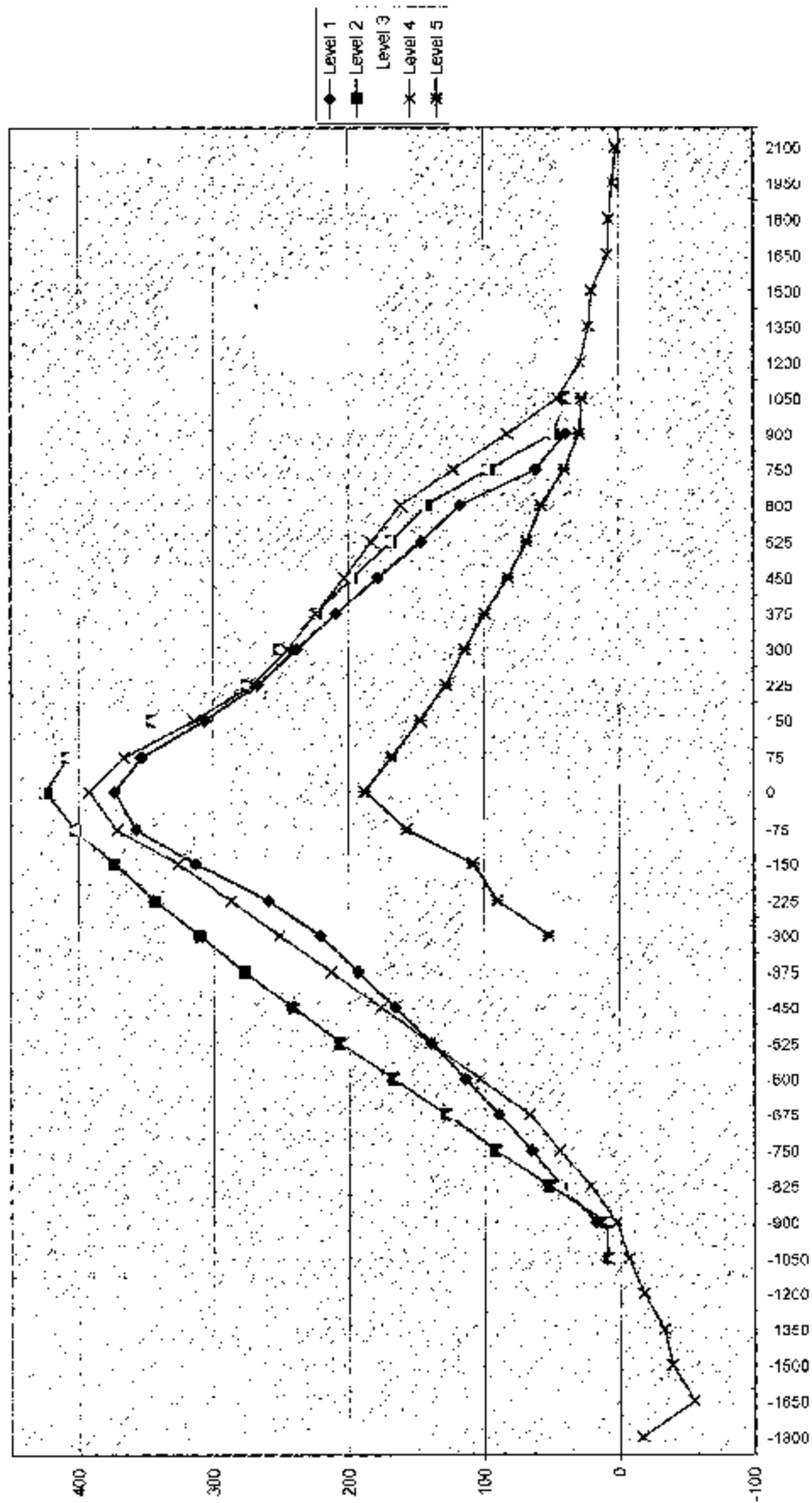
Units = mm

Given dimensions = Reference plane to car body

DATA SHEET NO. 9... (continued)

VEHICLE EXTERIOR CRUSH PROFILES

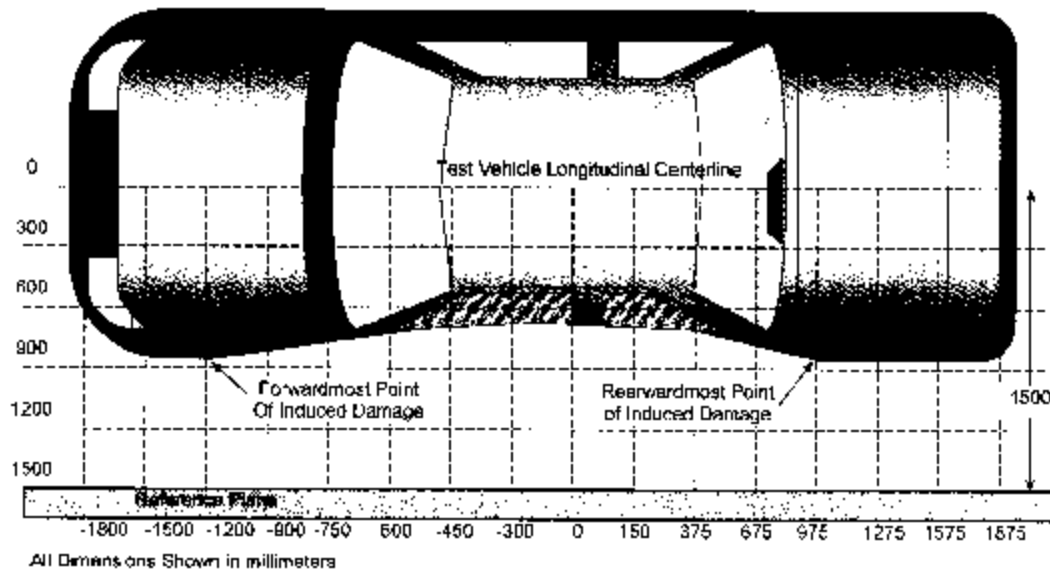
Test Vehicle: 2003 Volkswagen Passat 4 door NHTSA No. C35802
 Test Program: FMVSS 201P Test Date: March 26, 2003



DATA SHEET NO. 10
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2003 Volkswagen Passat 4 door
 Test Program: FMVSS 201P

NHTSA No. C35802
 Test Date: March 26, 2003



TOP VIEW

Damage Profile Distances

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	2100 mm	4	392	394	2
2	1525 mm	4	322	348	26
3	984 mm	4	302	363	61
4	380 mm	4	284	505	221
5	-330 mm	2	290	545	255
6	-900 mm	4	315	317	2

Reference plane is parallel to test vehicle longitudinal centerline

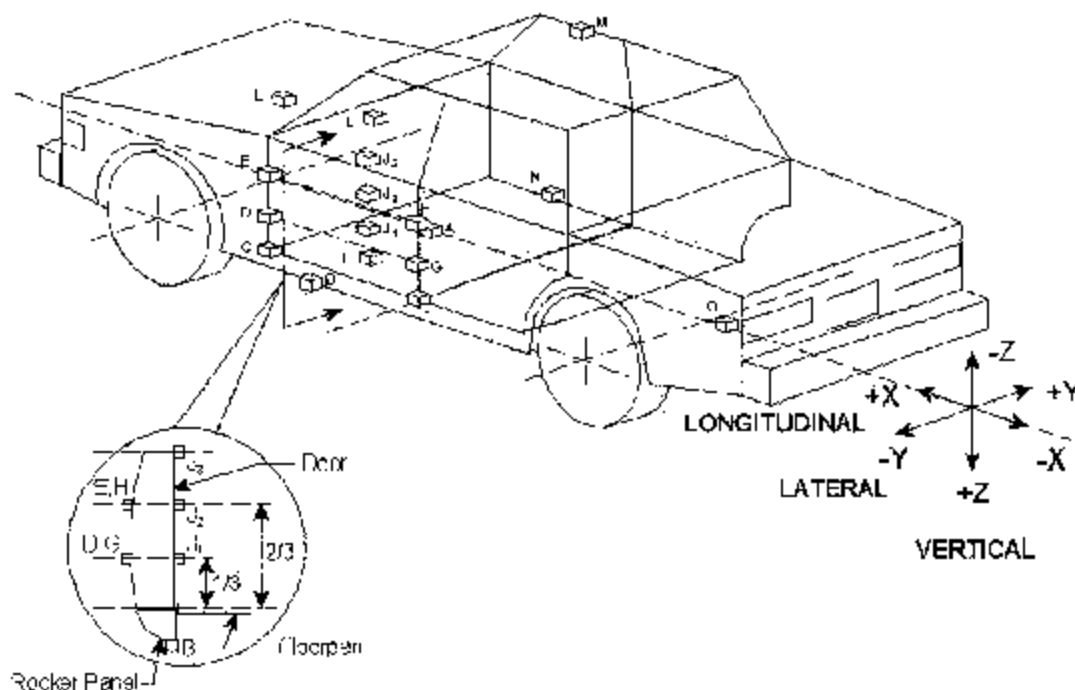
Given dimensions = Reference plane to car body

DATA SHEET NO. 11

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2003 Volkswagen Passat 4 door
 Test Program: FMVSS 201P

NHTSA No. C35802
 Test Date: March 26, 2003



No.	Location
A	Vehicle CG
B	Left Floor Sill
C	A Pillar Sill
D	A Pillar Low
E	A Pillar Mid
G	B Pillar Sill
H	B Pillar Low
I	B Pillar Mid

No.	Location
L	Driver Seat
M1	Driver Door Rib
M2	Driver Door Pelvis
M3	Driver Door Knee
N	Engine
O	Firewall
Q	Right Floor Sill
R	Rear Deck

DATA SHEET NO. 11... (continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2003 Volkswagen Passat 4 door
 Test Program: FMVSS 201P

NHTSA No. C35802
 Test Date: March 26, 2003

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Peak Values (G's)				
		Axis	Max	Time	Min	Time
A	Vehicle CG	X	12.5	73	-15.7	95
		Y	34.2	30	-6.8	42
		Z	8.0	79	-13.7	106
		RES	35.9	30		
B	Left Floor Sill	Y	27.2	13	-1.0	4
C	A Pillar Sill	Y	16.1	14	-2.3	5
D	A Pillar Low	Y	21.6	9	-4.0	16
E	A Pillar Mid	Y	13.8	11	-4.1	5
G	B Pillar Sill	Y	100.8	20	-47.6	25
L	Driver Seat	Y	63.2	22	-9.2	40
M1	Driver Door Rib	Y	288.8	23	-56.9	17
M2	Driver Door Pelvis	Y	123.0	8	-106.3	17
M3	Driver Door Knee	Y	68.7	12	-43.6	20
N	Engine	X	1.7	126	-4.6	58
		Y	15.1	71	-3.0	39
O	Firewall	Y	9.8	64	-1.0	7
Q	Right Floor Sill	Y	13.3	62	-0.3	197
R	Rear Deck	X	4.0	26	-4.0	110
		Y	13.2	67	-1.6	194

Positive Acceleration Polarities: Longitudinal (X) = + Forward
 (Conforms to SAE J211) Lateral (Y) = + Right
 Vertical (Z) = + Down

DATA SHEET NO. 11... (continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2003 Volkswagen Passat 4 door

NHTSA No. C35802

Test Program: FMVSS 201P

Test Date: March 26, 2003

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)			
		Axis	Pre-Test	Post-Test	Difference
A	Vehicle CG	X	2402	2389	-13
		Y	0	0	0
		Z	-442	-438	4
B	Left Floor Sill	X	2955	2788	-167
		Y	-881	-507	174
		Z	-212	-240	-28
C	A Pillar Sill	X	3125	3093	-32
		Y	-660	-641	19
		Z	-292	-290	2
D	A Pillar Low	X	3181	3050	-131
		Y	-760	-749	11
		Z	-535	-534	1
E	A Pillar Mid	X	3179	3055	-124
		Y	-764	746	18
		Z	-835	-832	3
C	B Pillar Sill	X	2044	1927	-107
		Y	-652	-495	157
		Z	-280	-263	17
L	Driver Seat	X	2259	2179	-80
		Y	-590	-425	165
		Z	-284	-251	33
M1	Driver Door Rib	X	2349	2282	-67
		Y	-740	-473	-267
		Z	-768	-749	19
M2	Driver Door Pelvis	X	2352	2280	-72
		Y	-732	-477	255
		Z	-630	-613	17
M3	Driver Door Knee	X	2766	2658	-108
		Y	-745	-806	139
		Z	-660	-650	10
N	Engine	X	4078	3936	-142
		Y	70	70	0
		Z	-795	-826	-31
O	Firewall	X	3720	3625	-95
		Y	-150	-150	0
		Z	-850	-865	-15
Q	Right Floor Sill	X	2315	2321	6
		Y	-679	-661	18
		Z	-222	-248	-26
R	Rear Deck	X	406	406	0
		Y	-10	-10	0
		Z	-475	-525	-50

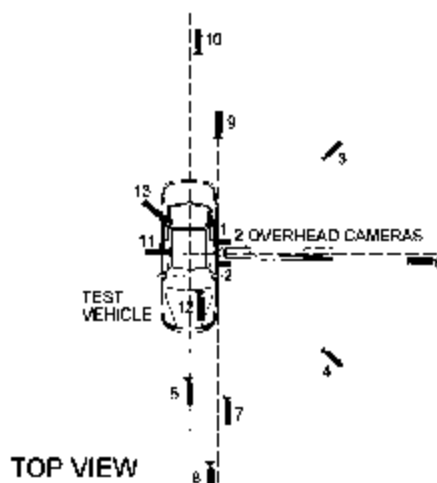
Reference Points

X – Rear of Vehicle (+ forward)
 Y – Vehicle Centerline (+ to right)
 Z – Ground Plane (+ down)

DATA SHEET NO. 12
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2003 Volkswagen Passat 4 door
 Test Program: FMVSS 201P

NHTSA No. C35802
 Test Date: March 26, 2003



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall	-800	0	-5000	8	1042
2	Overhead Close-Up	0	0	-5000	13	1020
3	Left Side 45° Rearward Pole View	2450	-5300	-1300	35	1036
4	Right Side 45° Forward Pole View	2540	3400	-1310	35	1026
5	Real Time				13	24
6*	Left Side Rear Pole View					
7	Front Ground Level Vehicle/Pole Impact	100	8510	-1410	25	1042
8	Front Ground Level Vehicle Roof Targets and Vehicle/Pole Impact	-920	8560	-1570	25	830
9	Rear Ground Level Vehicle/Pole Impact	700	-9640	-1590	25	1031
10	Rear Ground Level	-70	-9120	-1410	25	1020
11	Test Vehicle Onboard Driver Side View				8	513
12	Test Vehicle Onboard Driver Front View				13	526
13	Test Vehicle Onboard Driver ¾ Rear View				13	526

Reference Points X - + Forward of Impact
 Y - + Right of Impact
 Z - + Ground Plane Down

* Camera 6 was not used for this test.

DATA SHEET NO. 13

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2003 Volkswagen Passat 4 door
Test Program: FMVSS 201P

NHTSA No. C35802
Test Date: March 26, 2003

Test Time: 11:30 AM

Temperature at Time of Impact: 21°C

Stoddard Solvent Spillage Measurements

- A. From impact until vehicle motion ceases: 0
(Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0
(Maximum allowable = 5 ounces)
- C. For the following 25 minutes: 0
(Maximum allowable = 1 oz./minute)
- D. Spillage Details: None

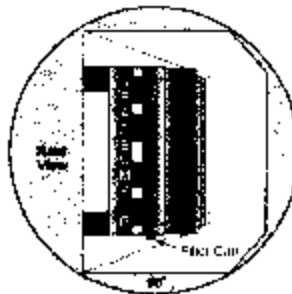
DATA SHEET NO. 14
FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2003 Volkswagen Passat 4 door
 Test Program: FMVSS 201P

NHTSA No. C35802
 Test Date: March 26, 2003



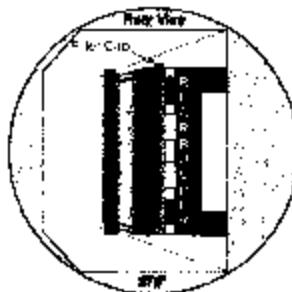
0° to 90°



90° to 180°



180° to 270°



270° to 360°

1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent Spillage locations: None

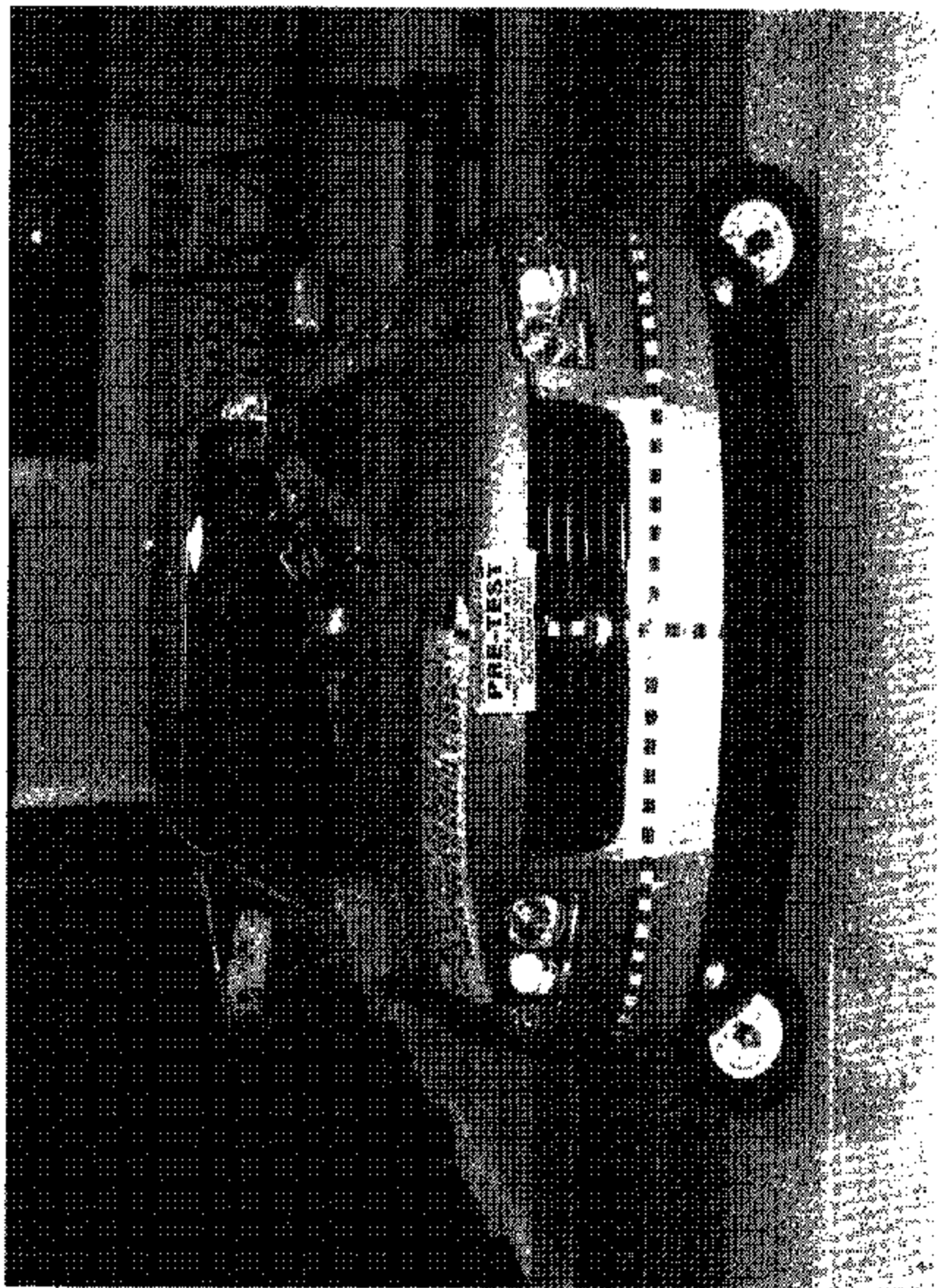
Rollover Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° to 90°	162	300	0
90° to 180°	150	300	0
180° to 270°	138	300	0
270° to 360°	156	300	0

APPENDIX A
PHOTOGRAPHS

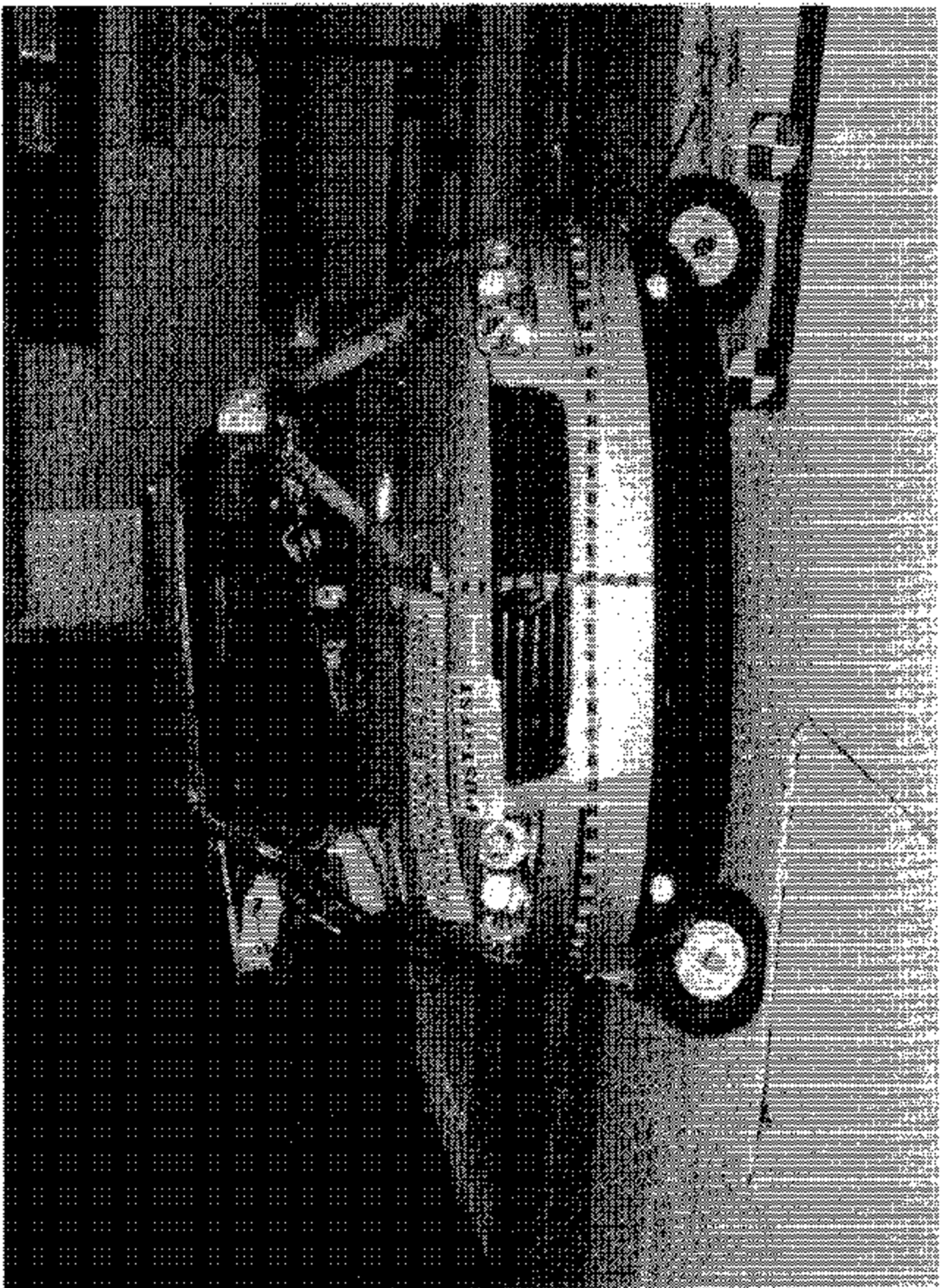
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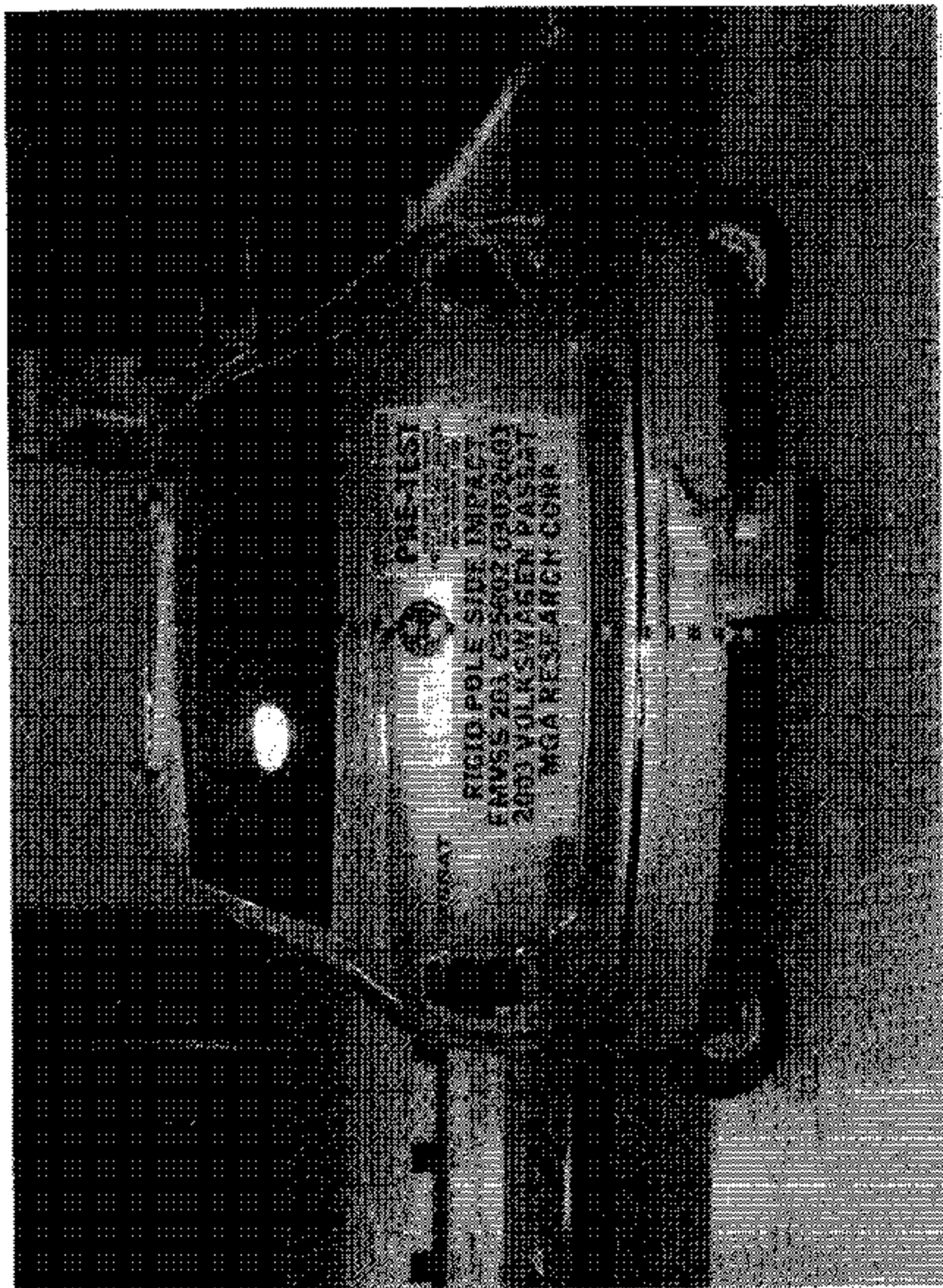
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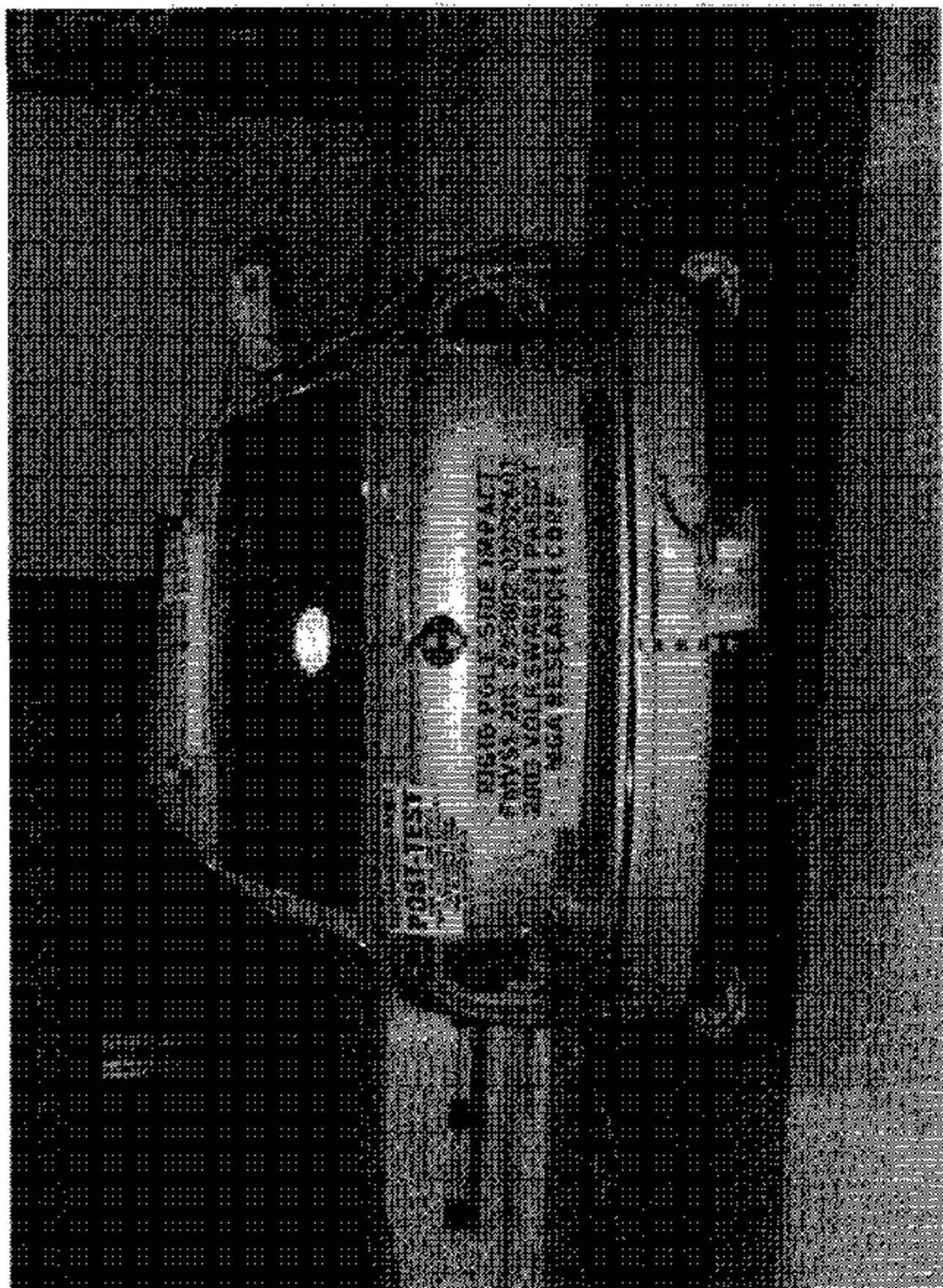
Pre-Test Front View of Test Vehicle



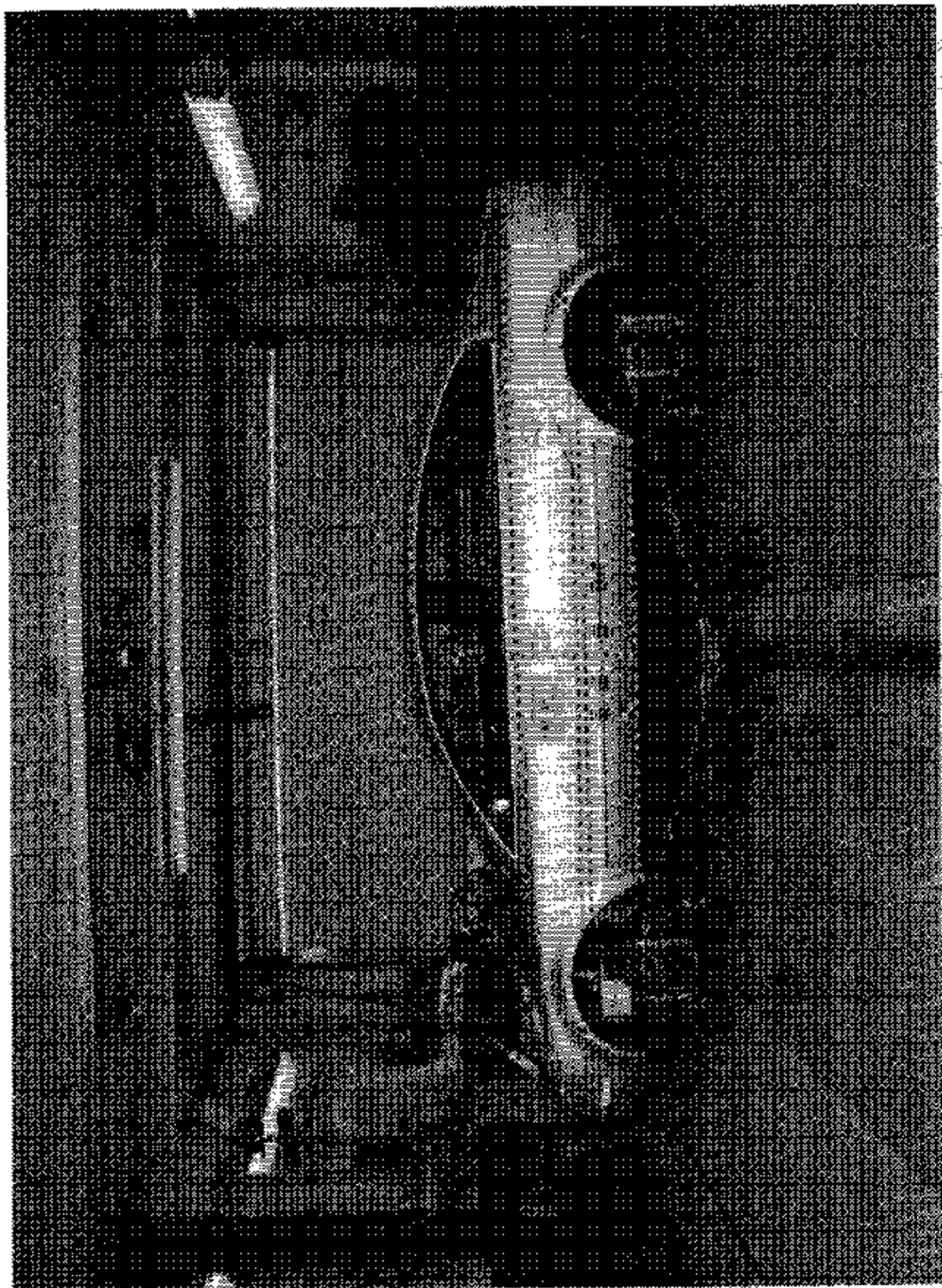
Post-Test Front View of Test Vehicle



Pre-Test Rear View of Test Vehicle

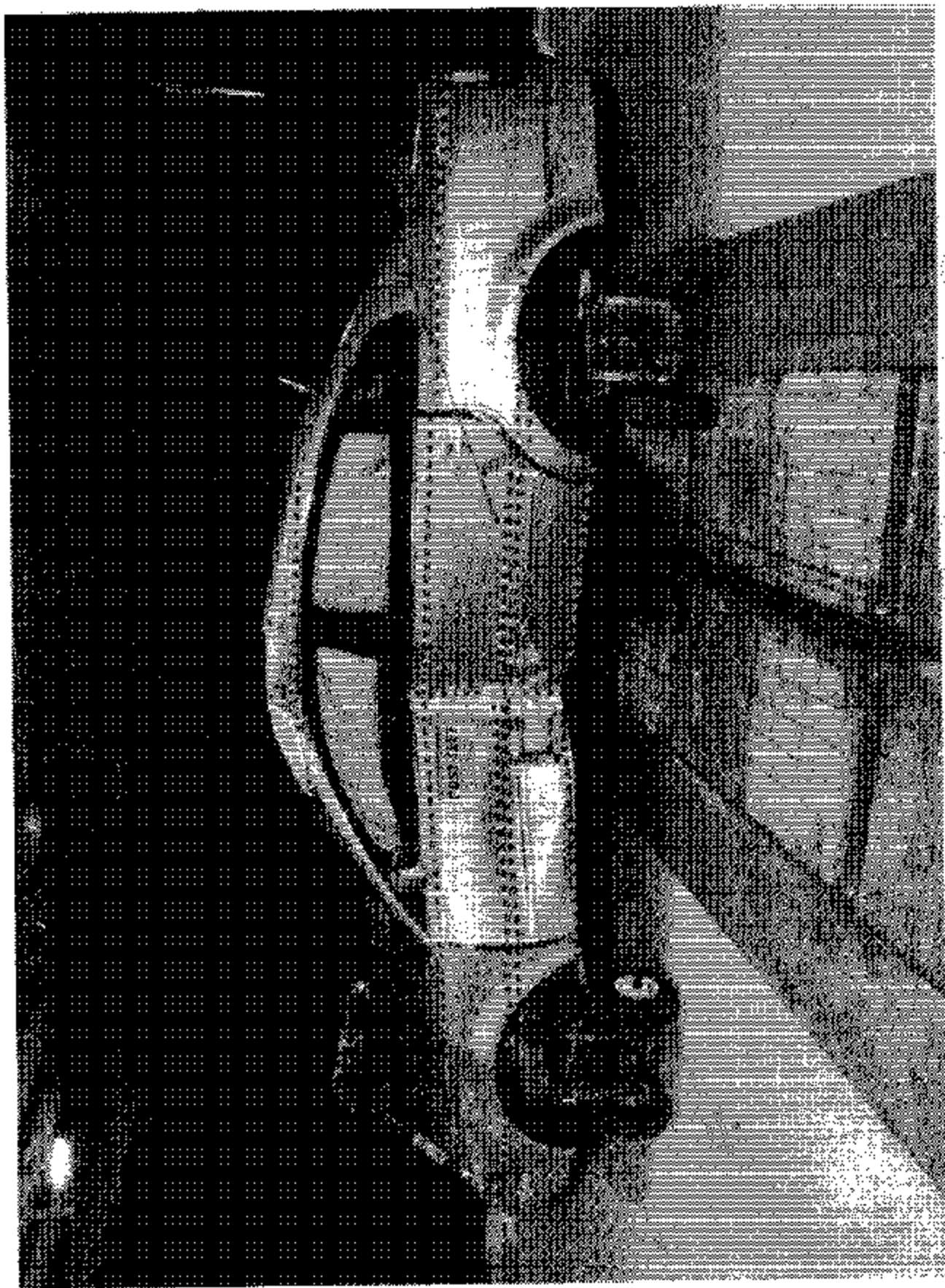


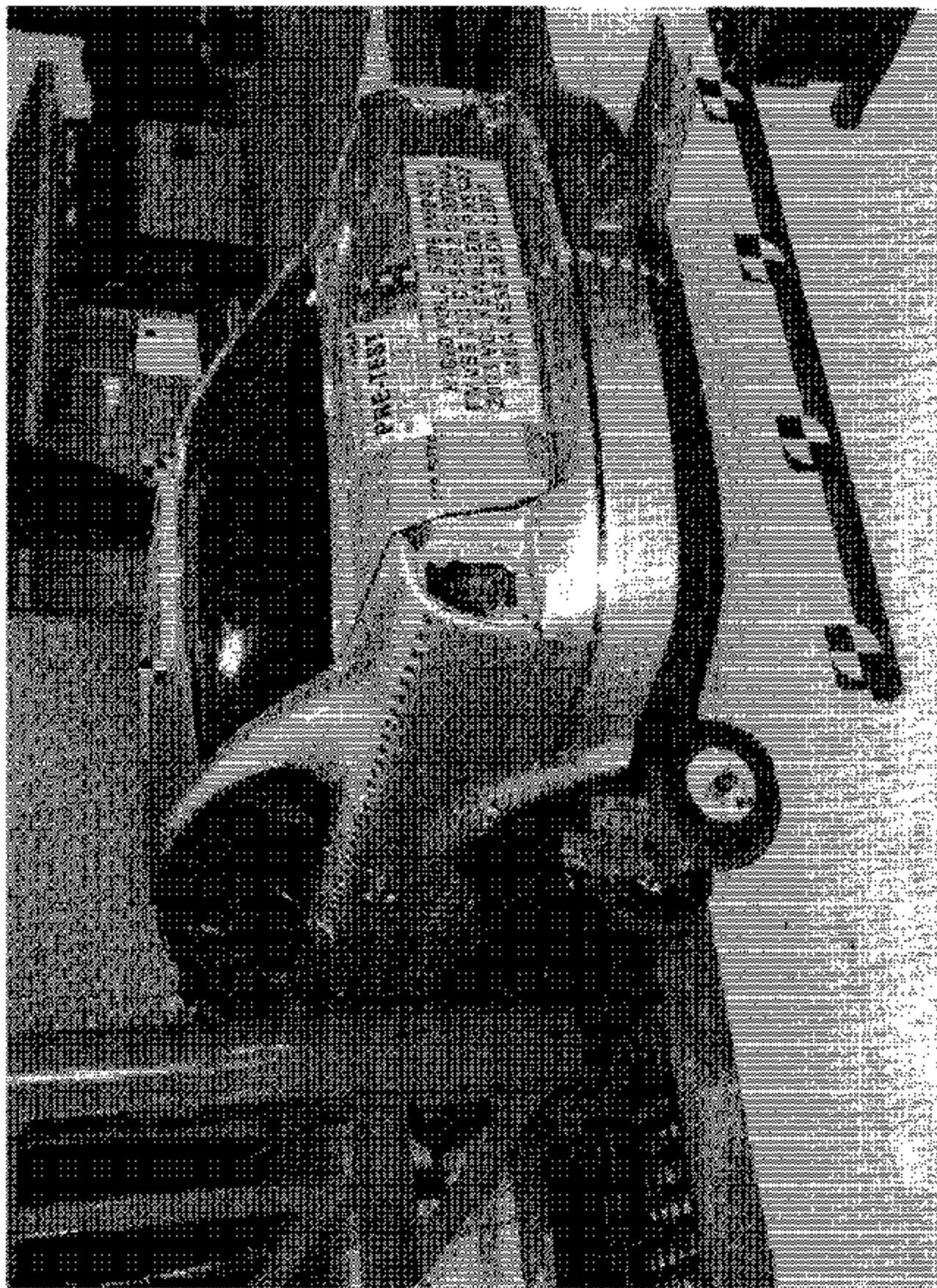
Post-Test Rear View of Test Vehicle



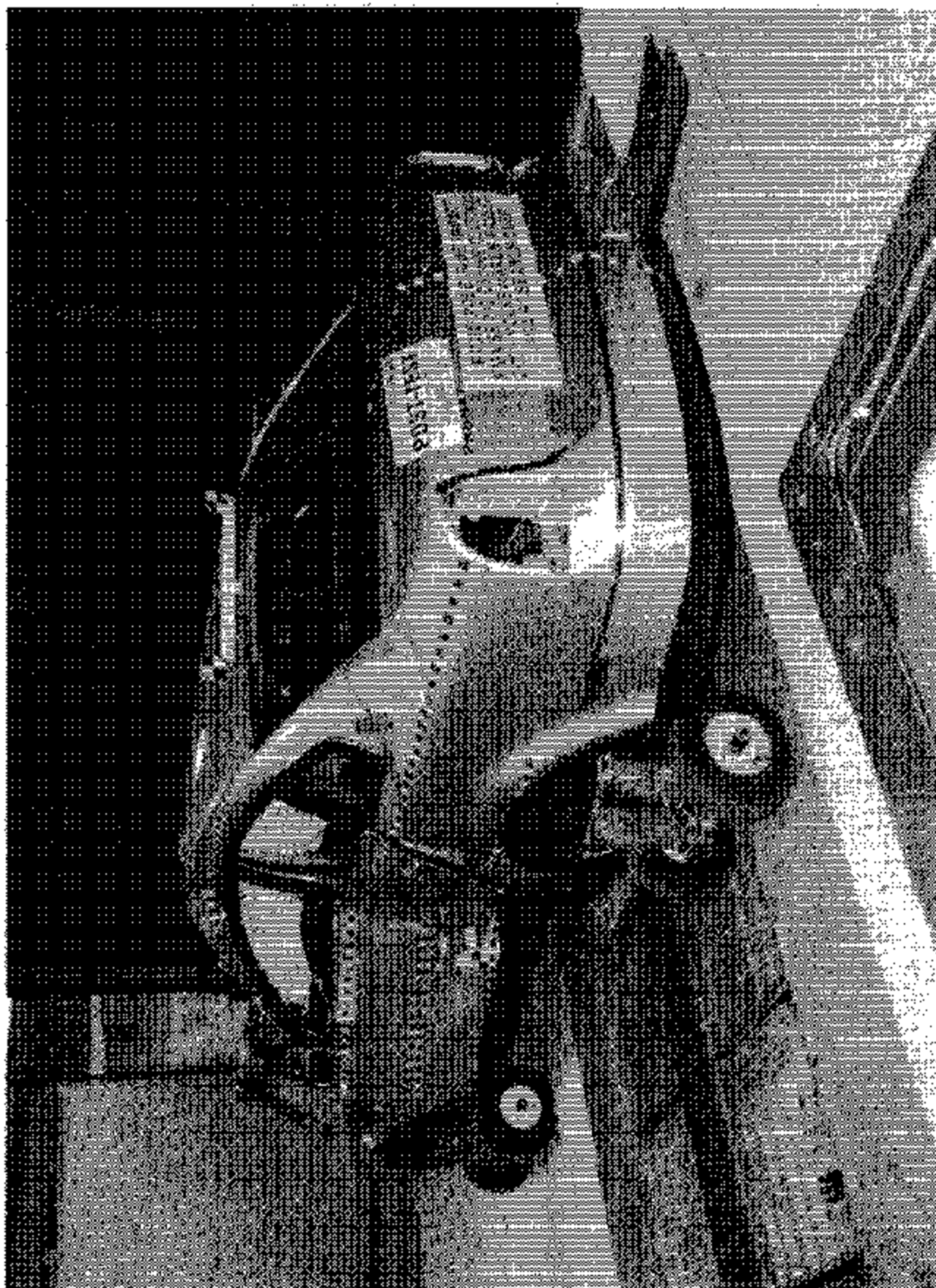
Pre-Test Left Side View of Test Vehicle

Post-Test Left Side View of Test Vehicle

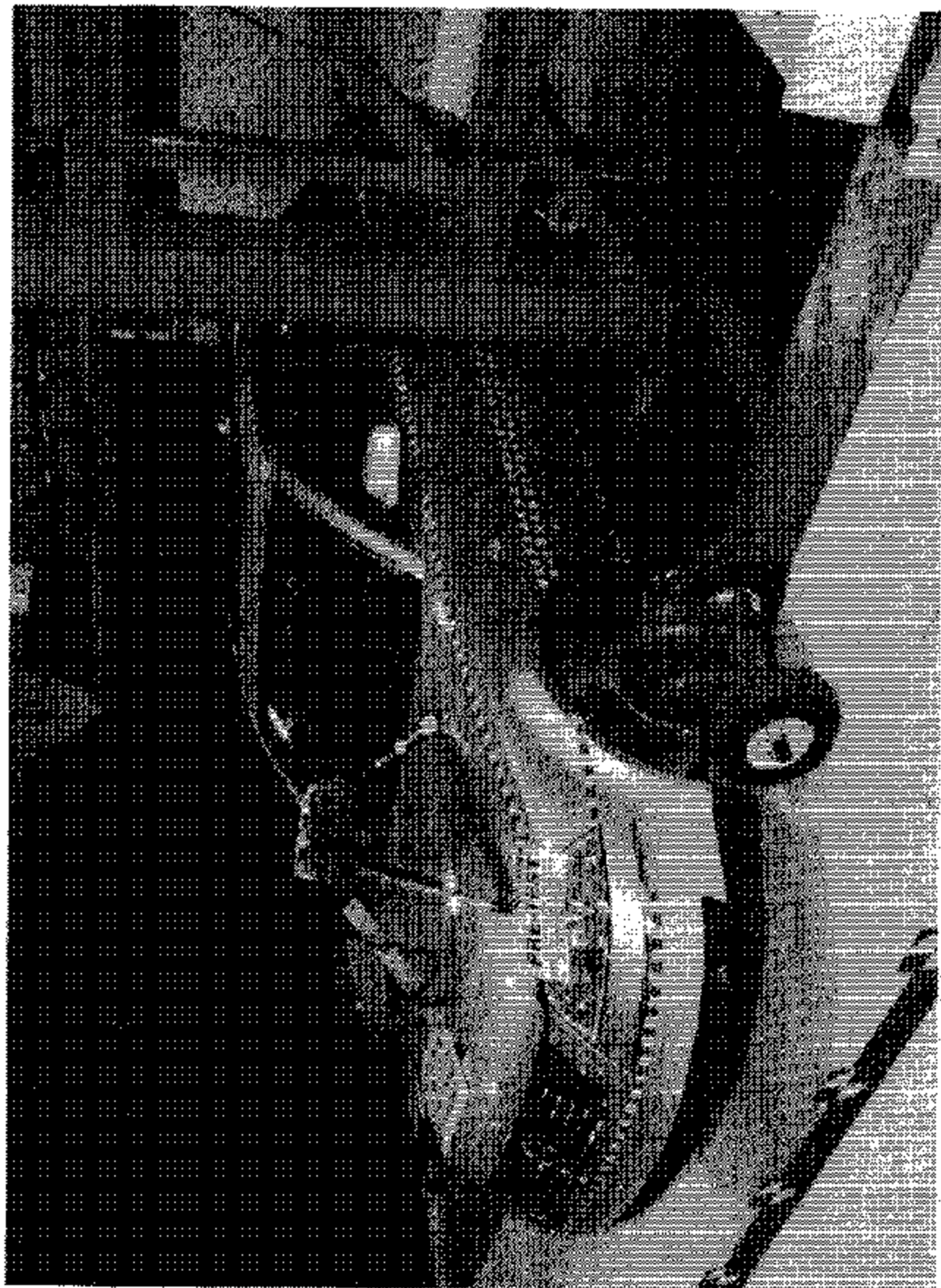




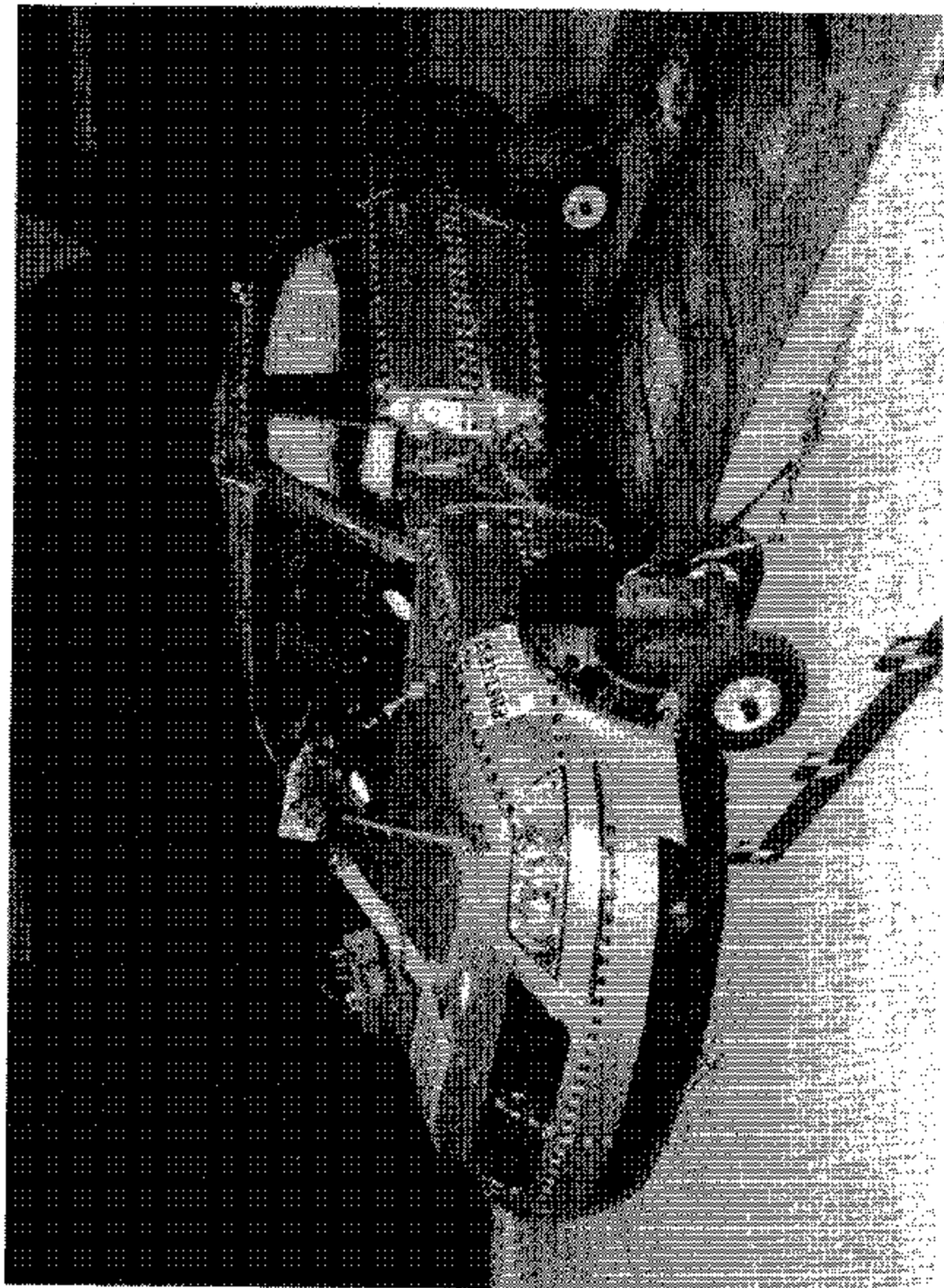
Pre-Test Left Rear Three-Quarter View



Post-Test Left Rear Three-Quarter View



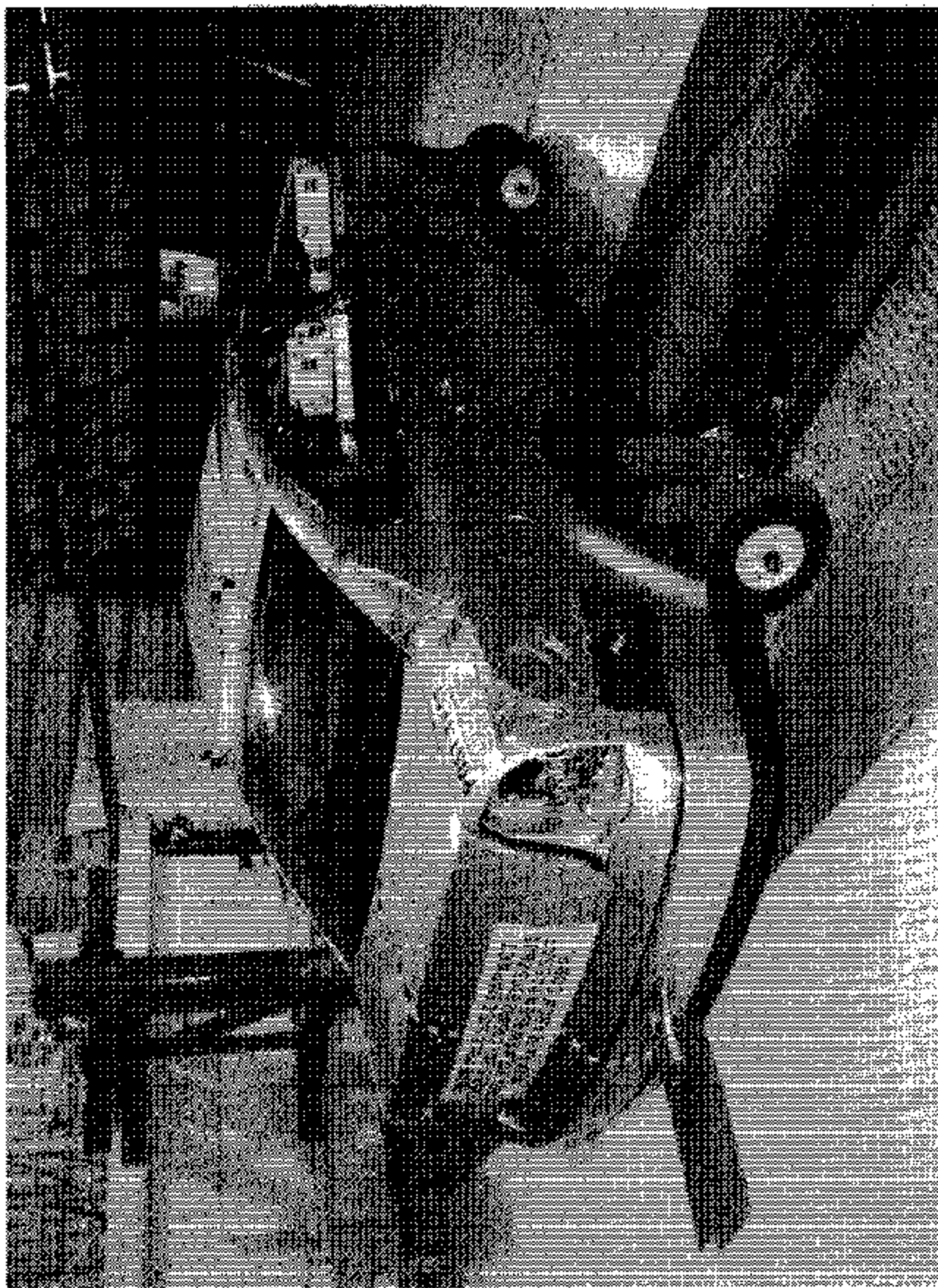
Pre-Test Left Front Three-Quarter View



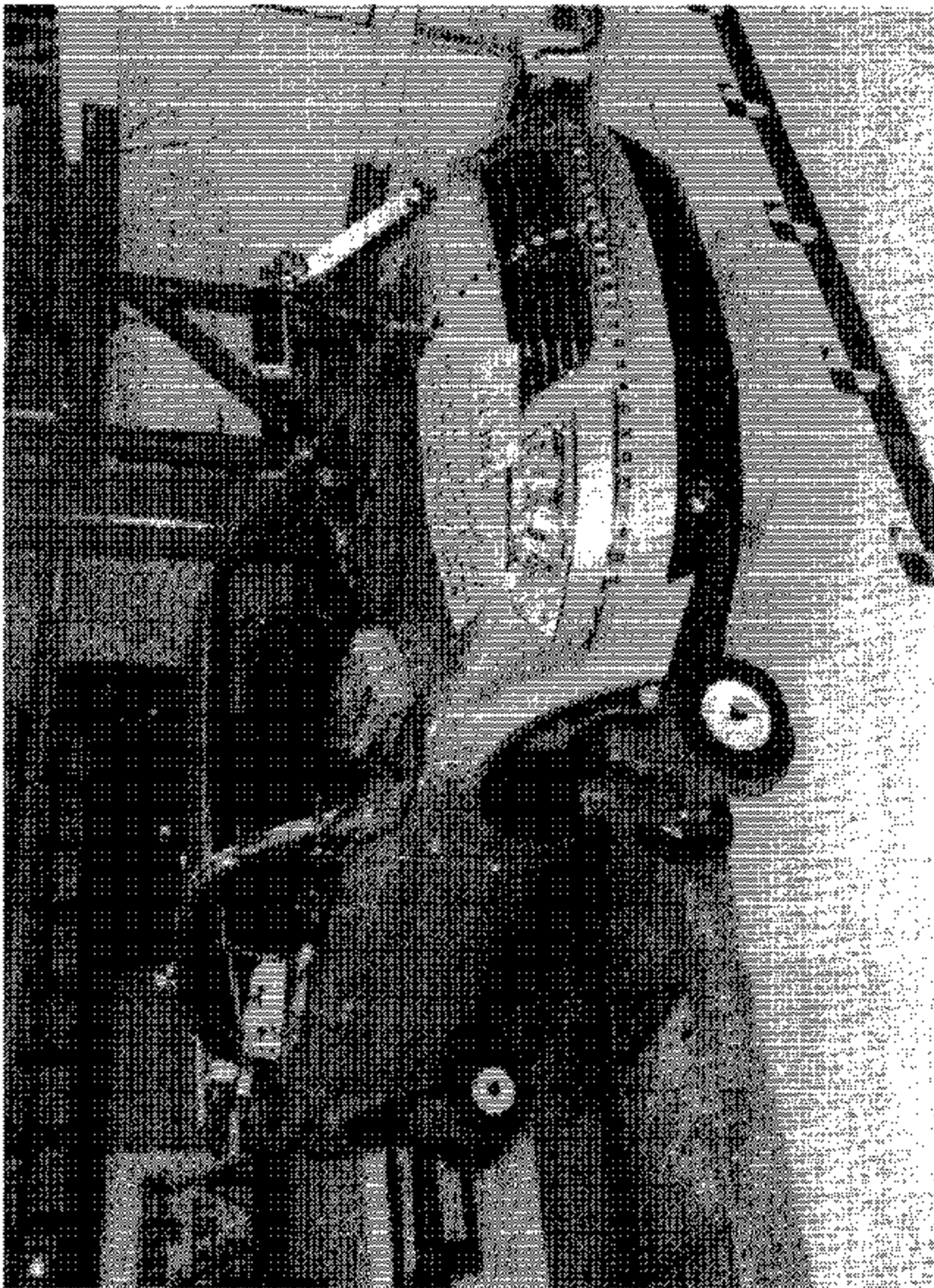
Post-Test Left Front Three-Quarter View



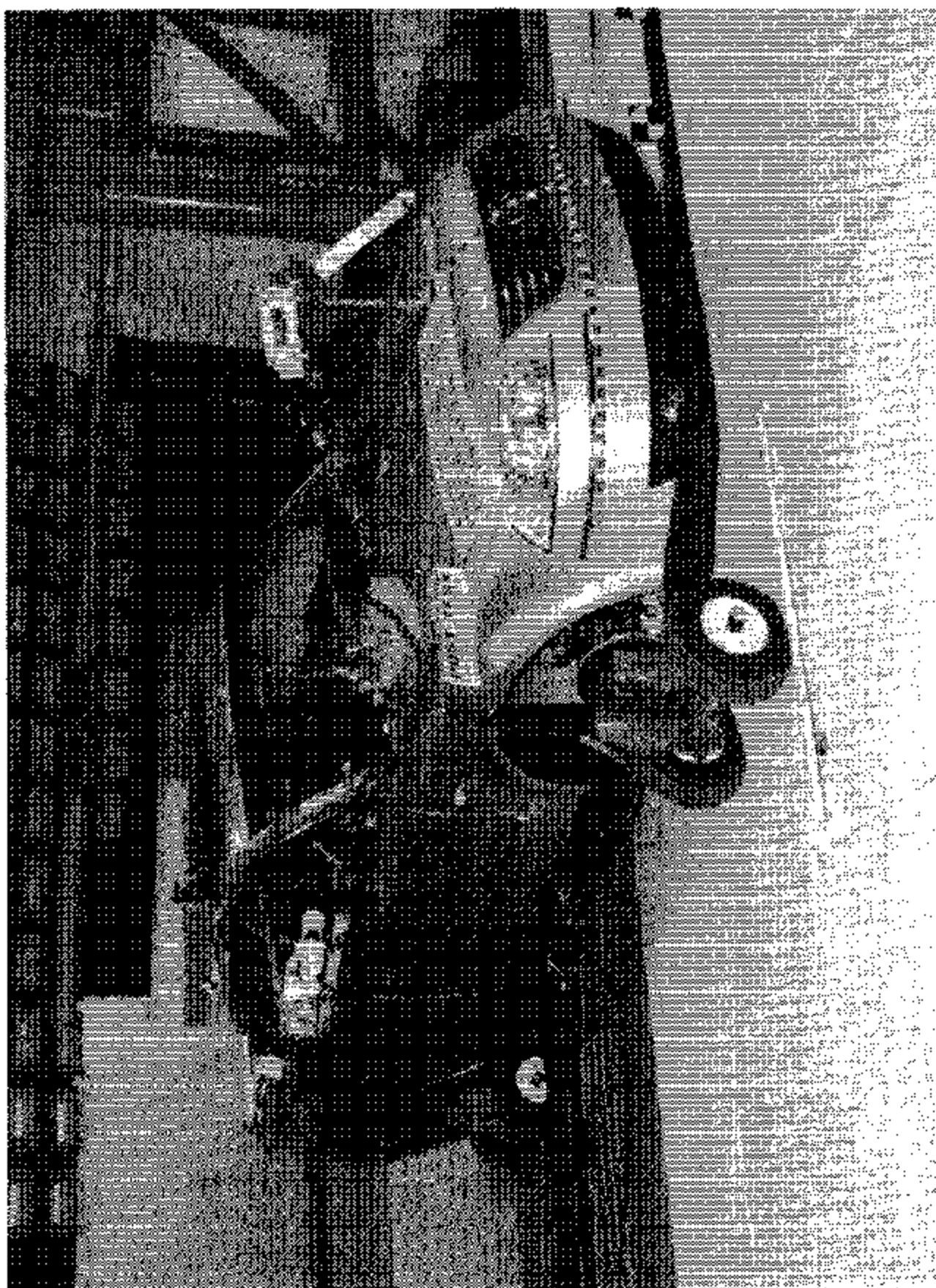
Pre-Test Right Rear Three-Quarter View



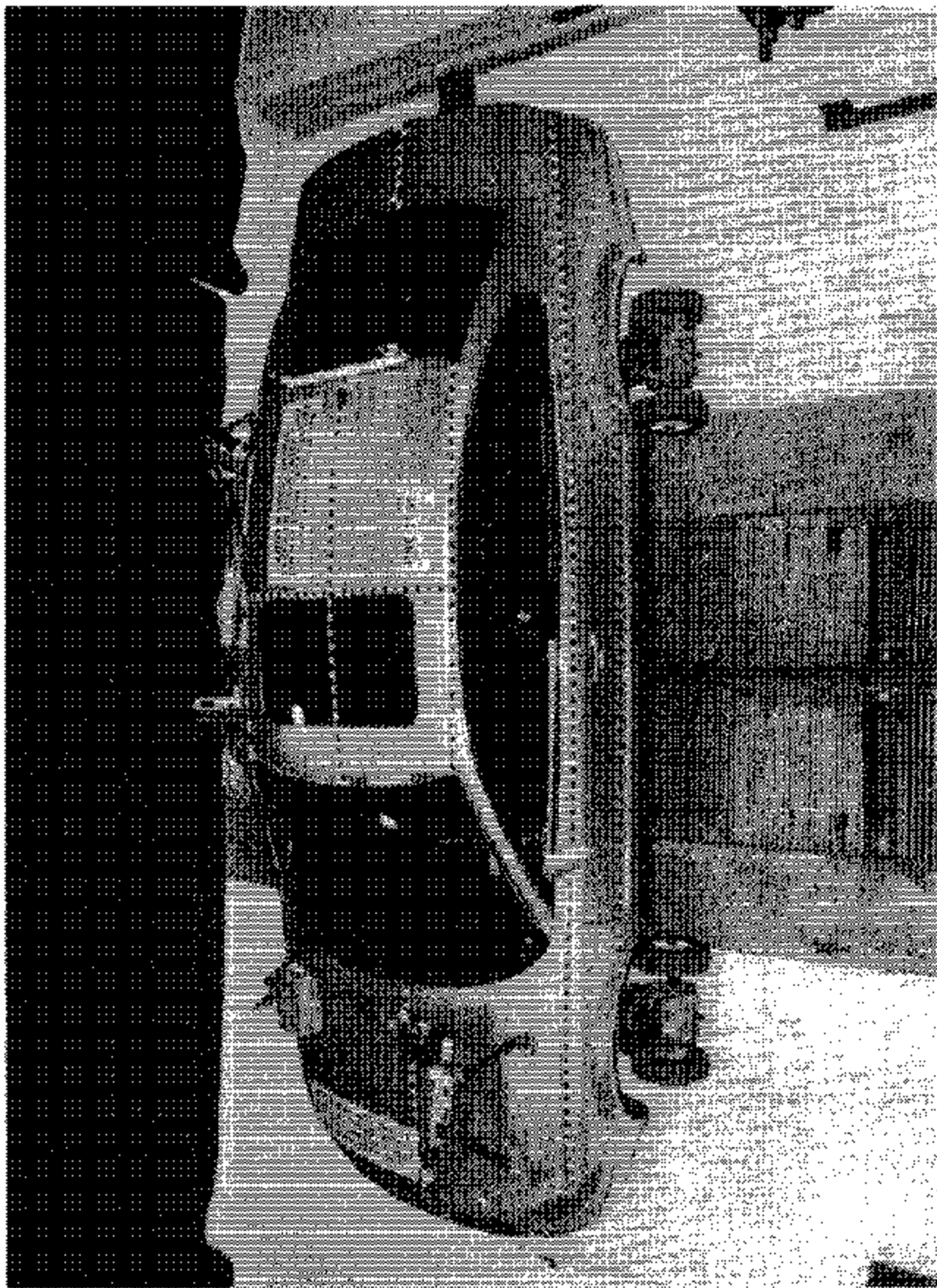
Post-Test Right Rear Three-Quarter View



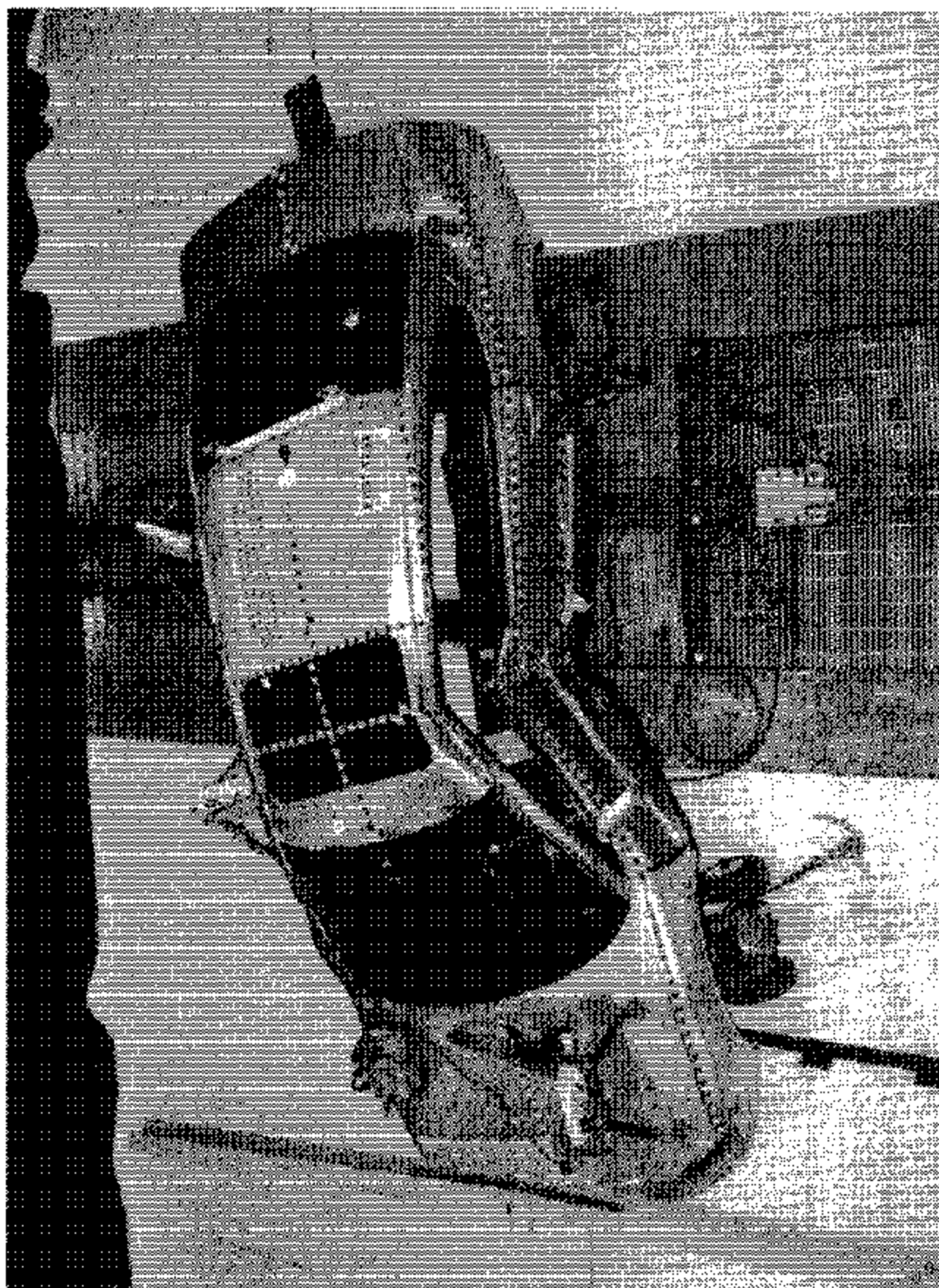
Pre-Test Right Front Three-Quarter View



Post-Test Right Front Three-Quarter View



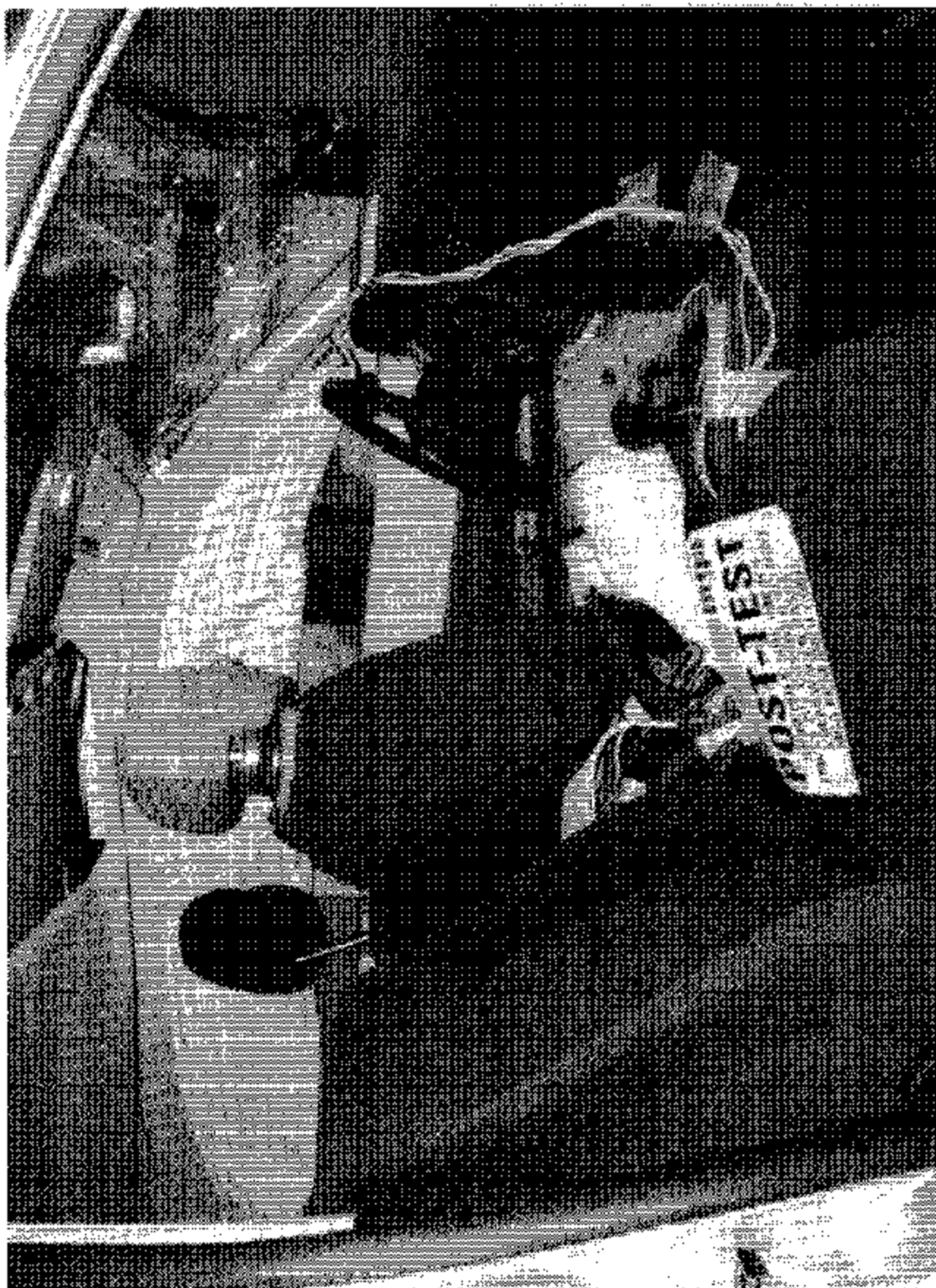
Pre-Test Overhead View of Test Vehicle



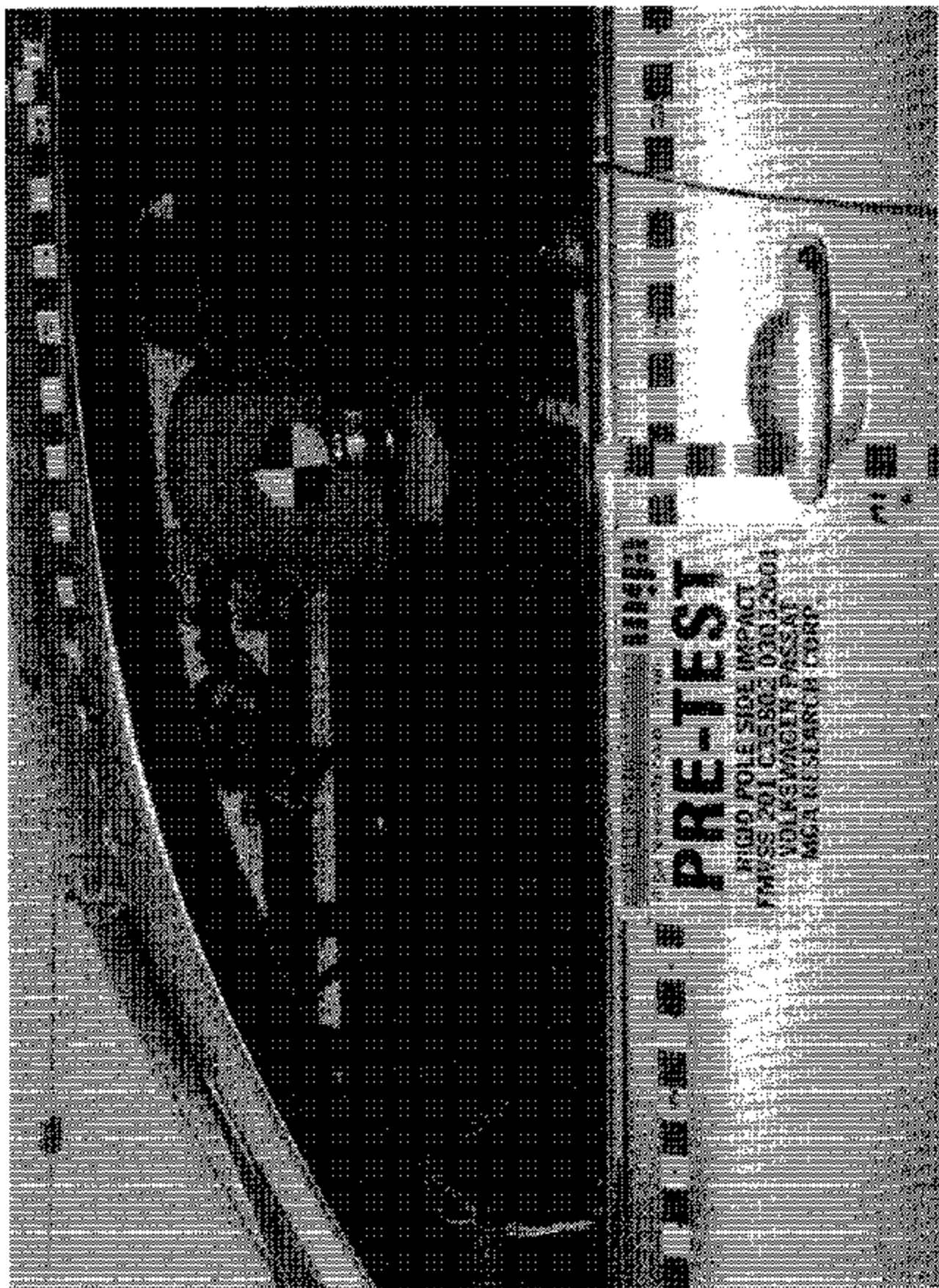
Post-Test Overhead View of Test Vehicle



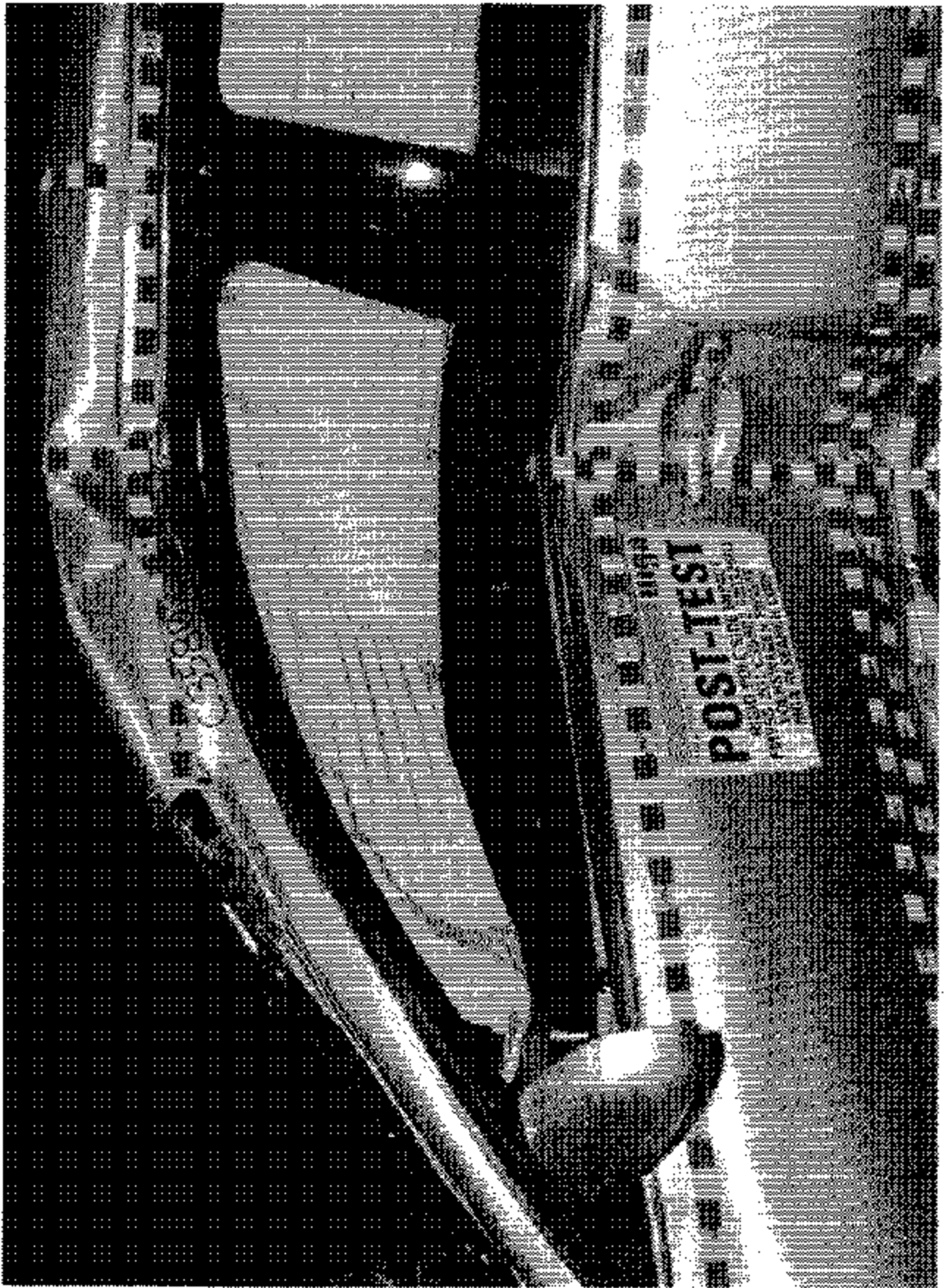
Pre-Test Driver Dummy Right Side View



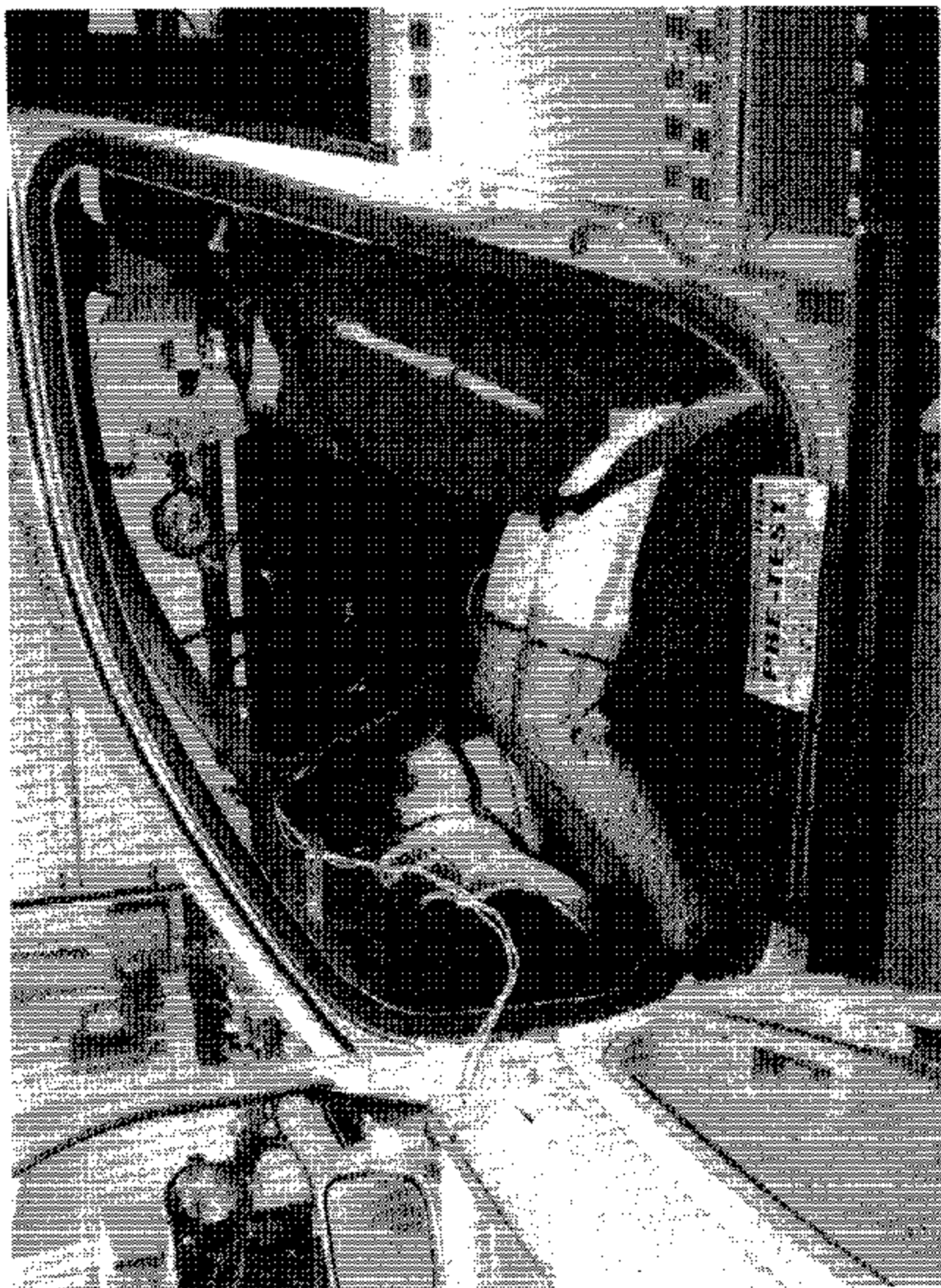
Post-Test Driver Dummy Right Side View



Pre-Test Driver Dummy Left Side View



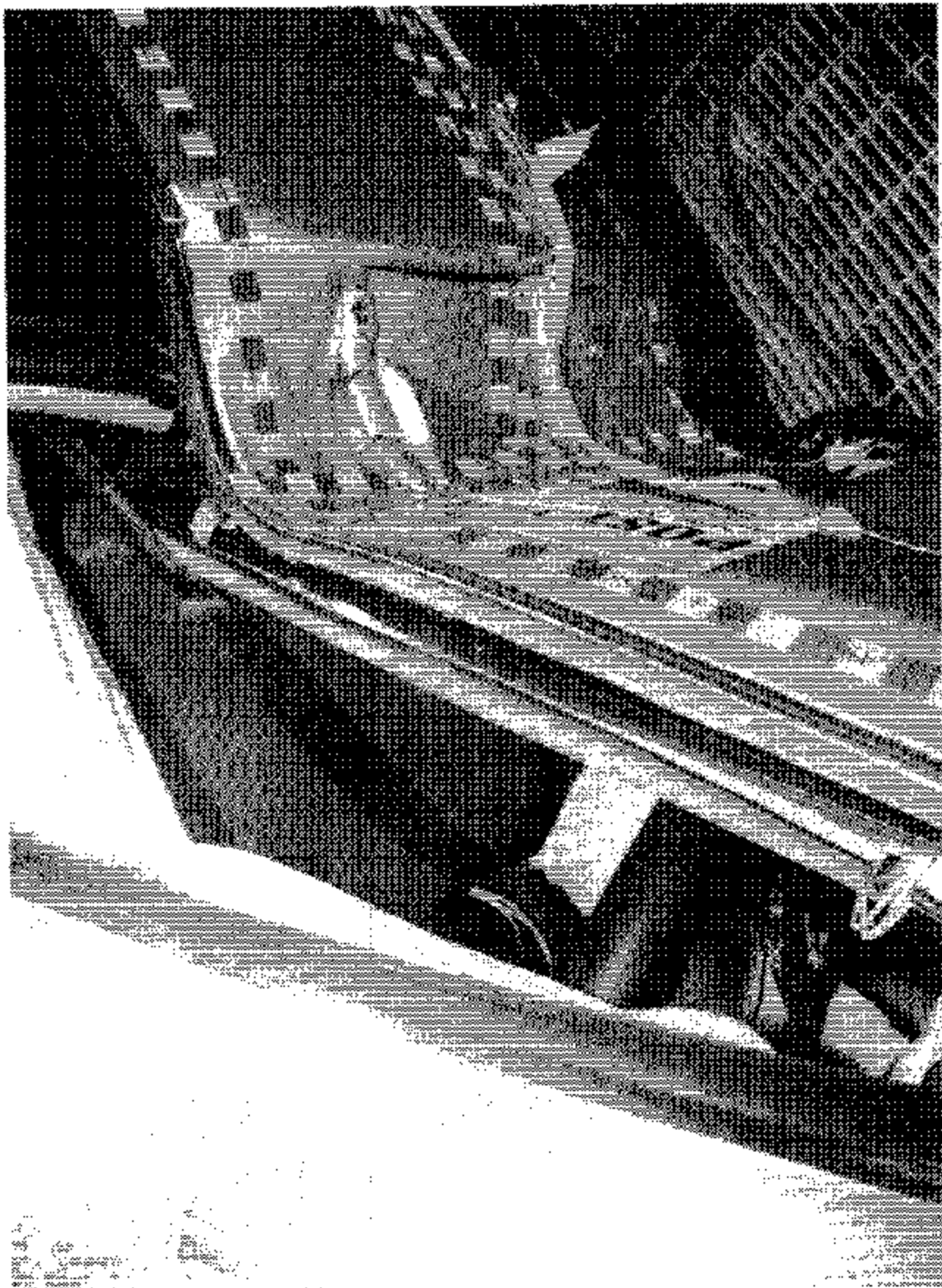
Post-Test Driver Dummy Left Side View



Pre-Test Driver Dummy Left Side View (Door Open)



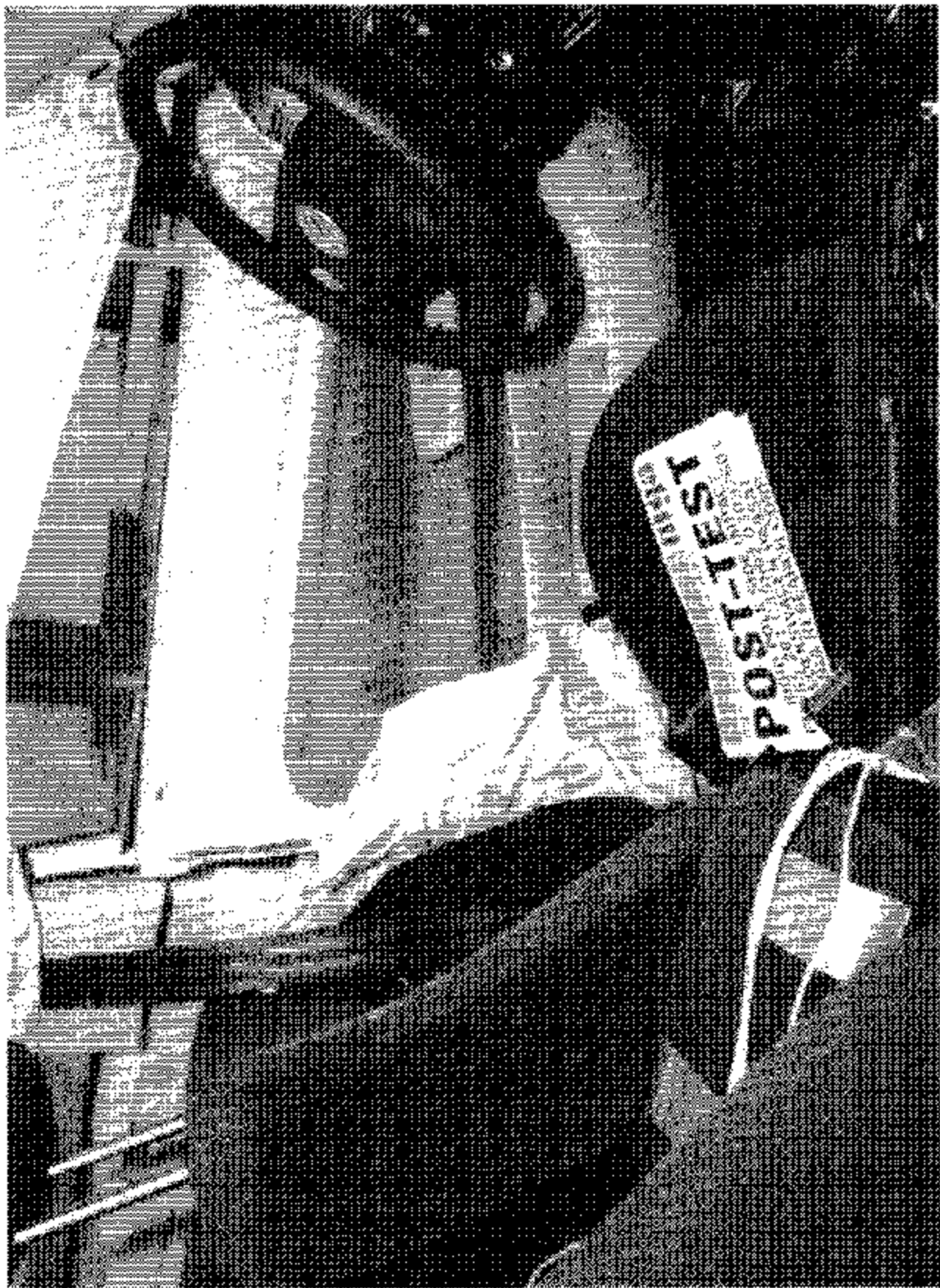
Pre-Test Driver Dummy Shoulder and Door Top View



Post-Test Driver Dummy Shoulder and Door Top View



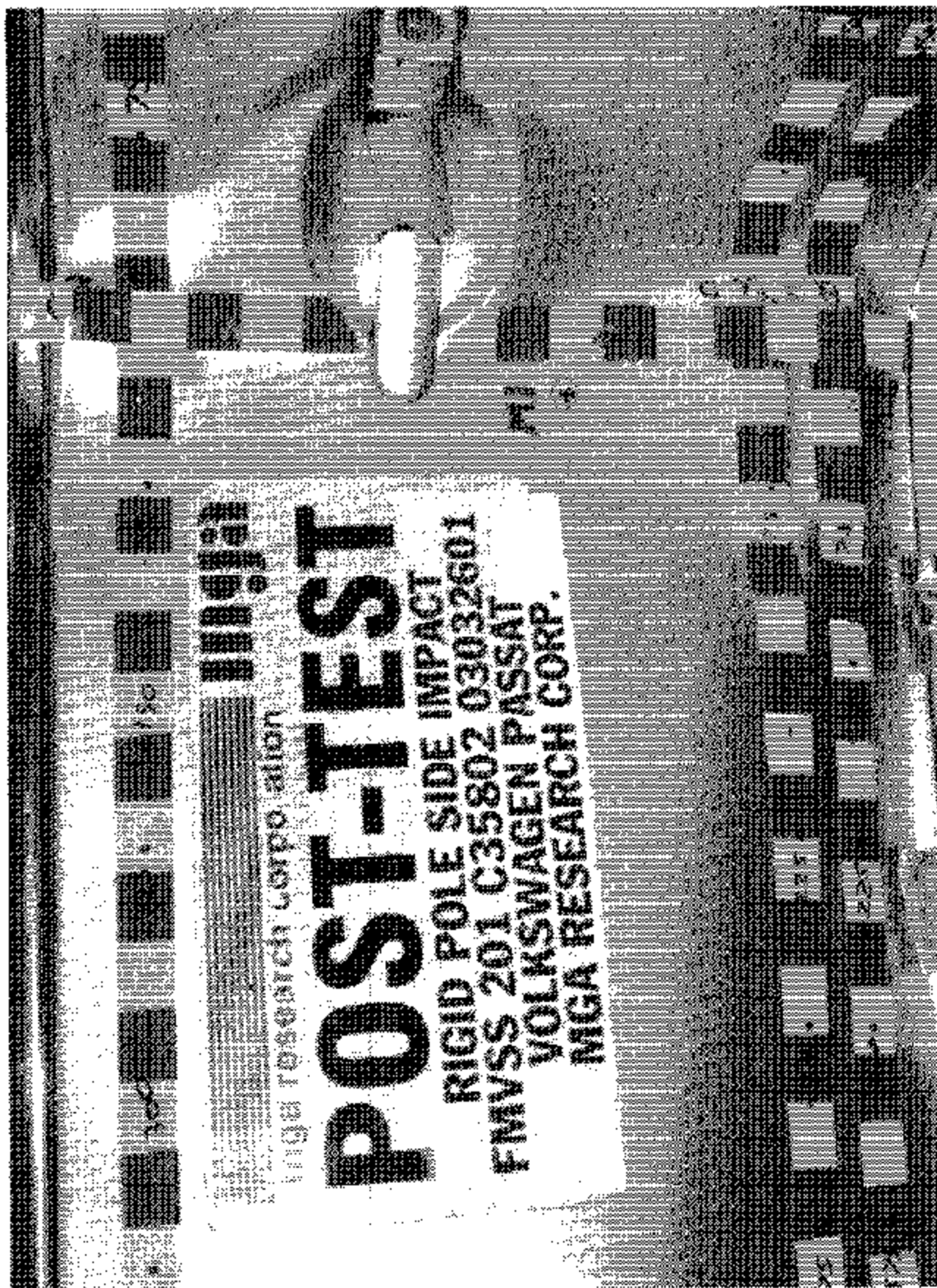
Post-Test Driver Dummy Head Contact



Post-Test Driver Dummy Thorax Contact



Post-Test Driver Dummy Contact



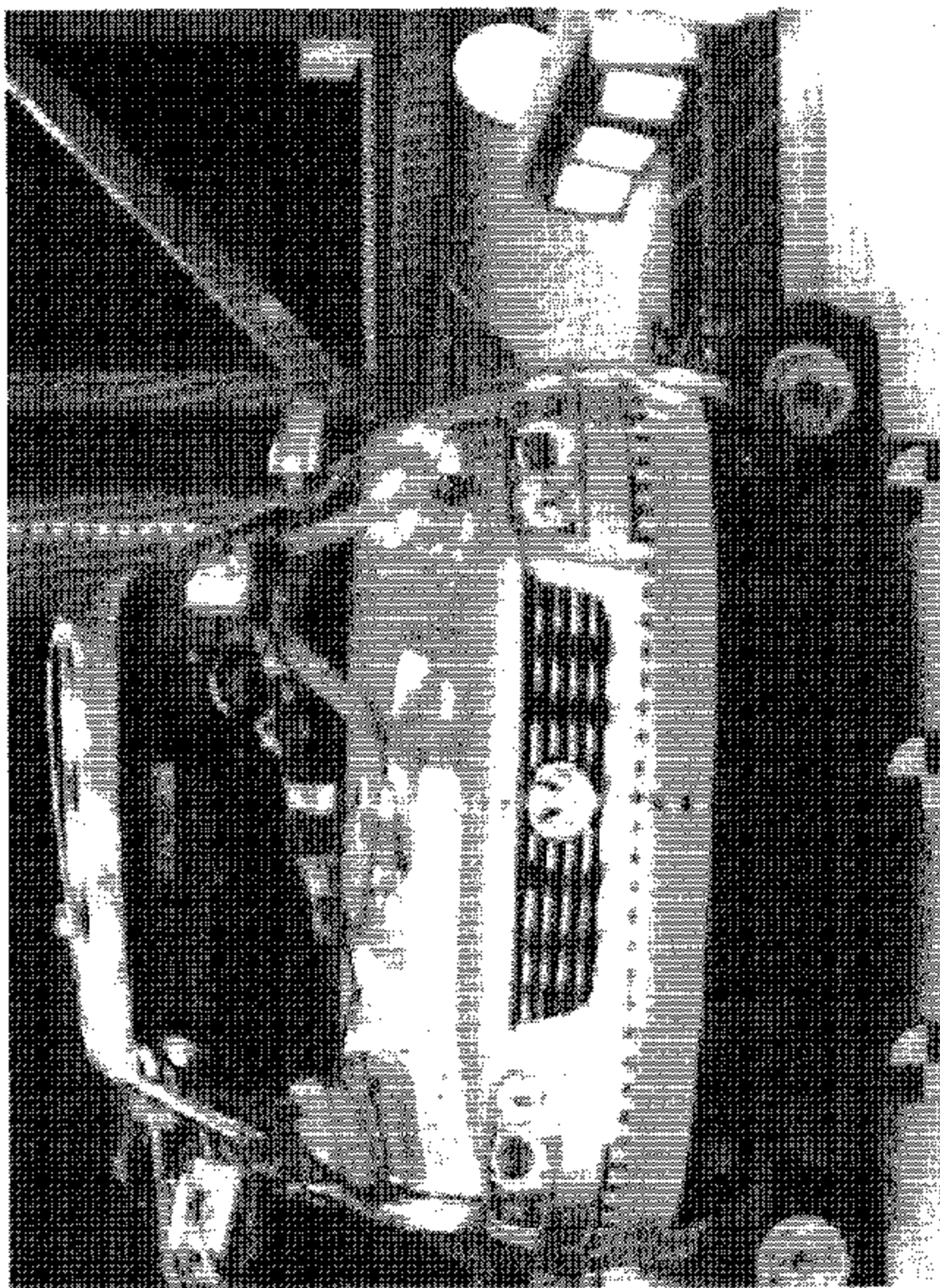
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rigid research corporation

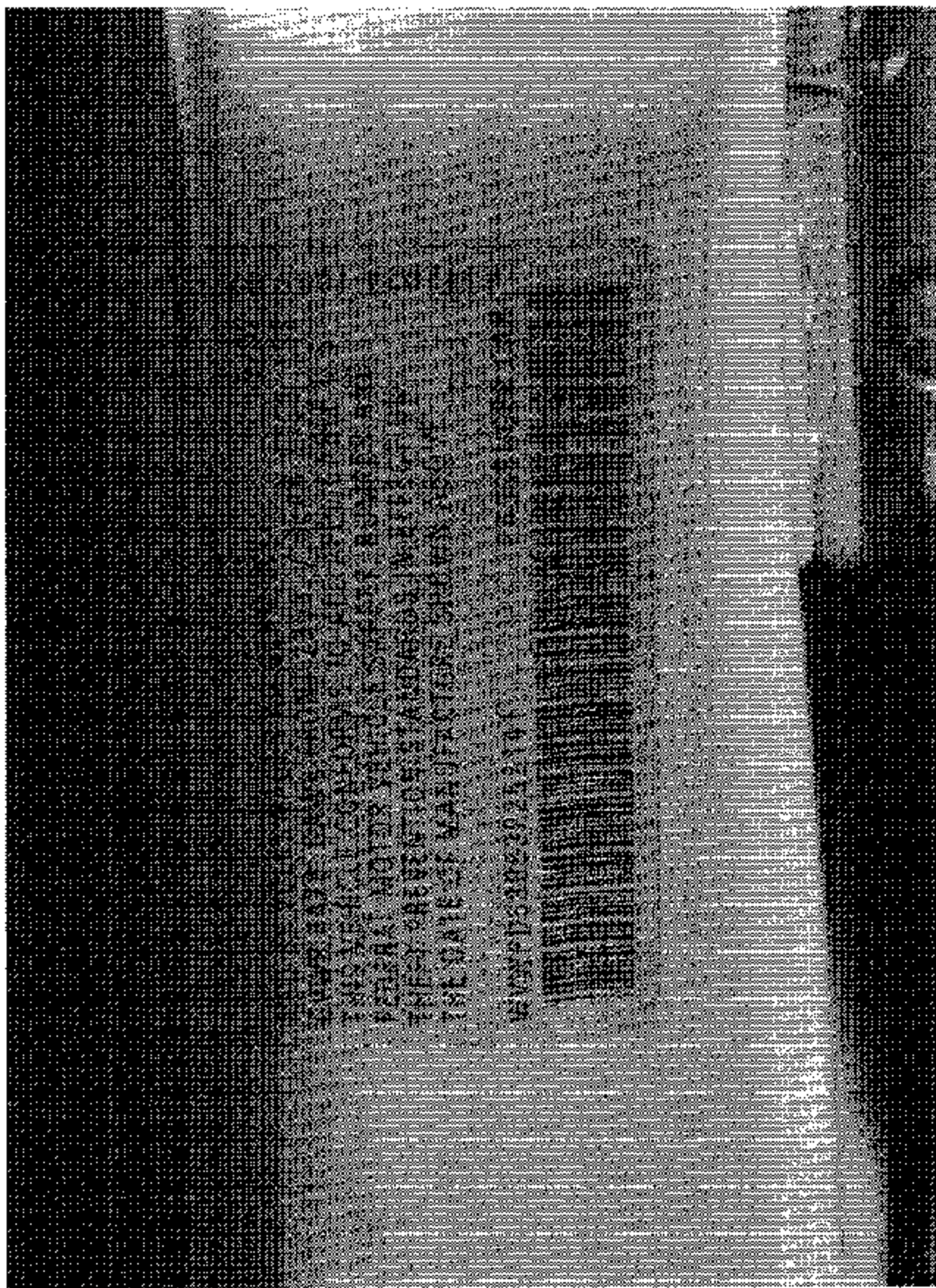
POST-TEST

RIGID POLE SIDE IMPACT
FMVSS 201 C35802 03032601
VOLKSWAGEN PASSAT
MGA RESEARCH CORP.

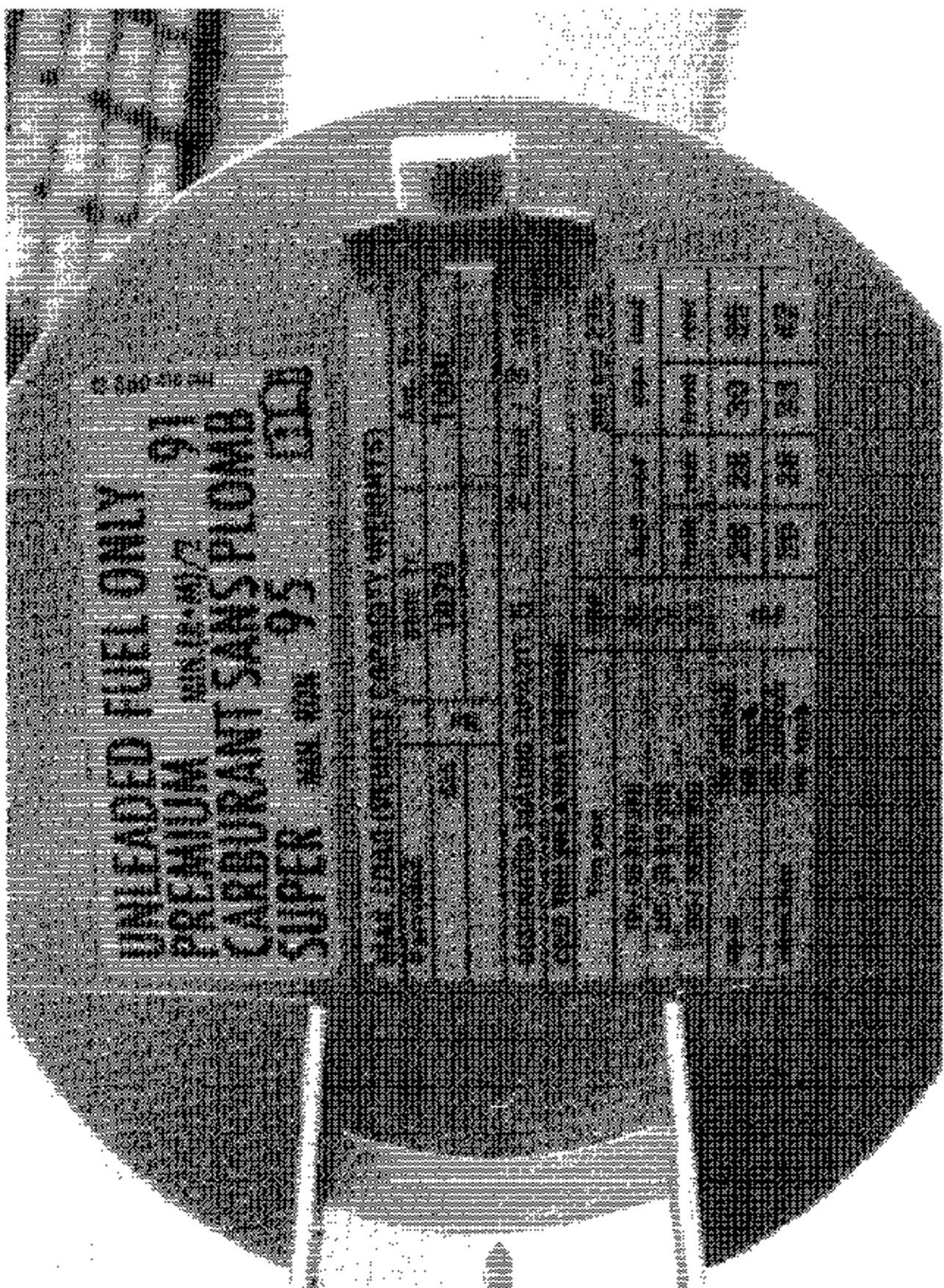
Post-Test Left Front Impact Point on Vehicle



Impact



Vehicle Certification Label



Tire Placard

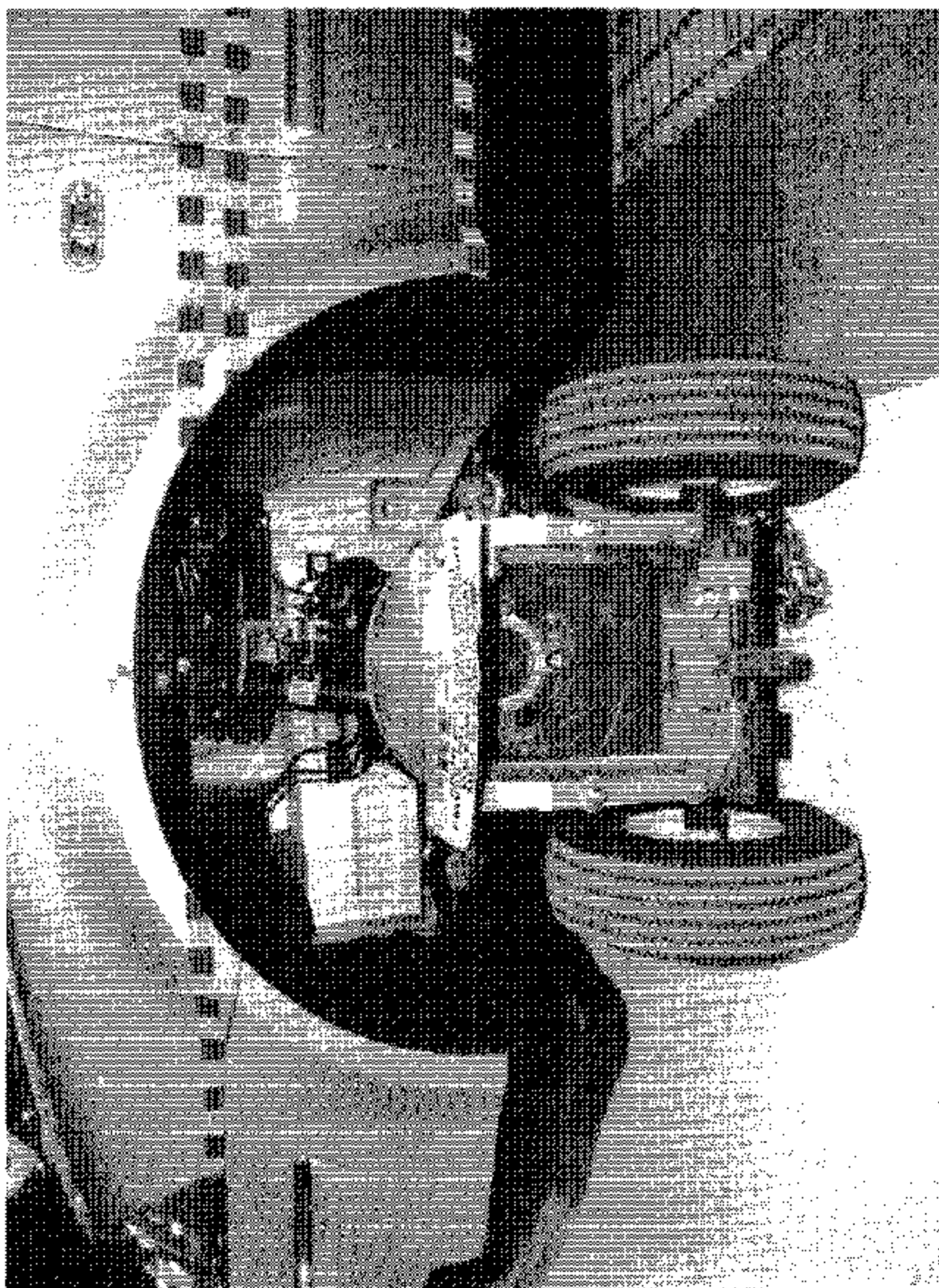
mga research corp. ed. en

PRE-TEST

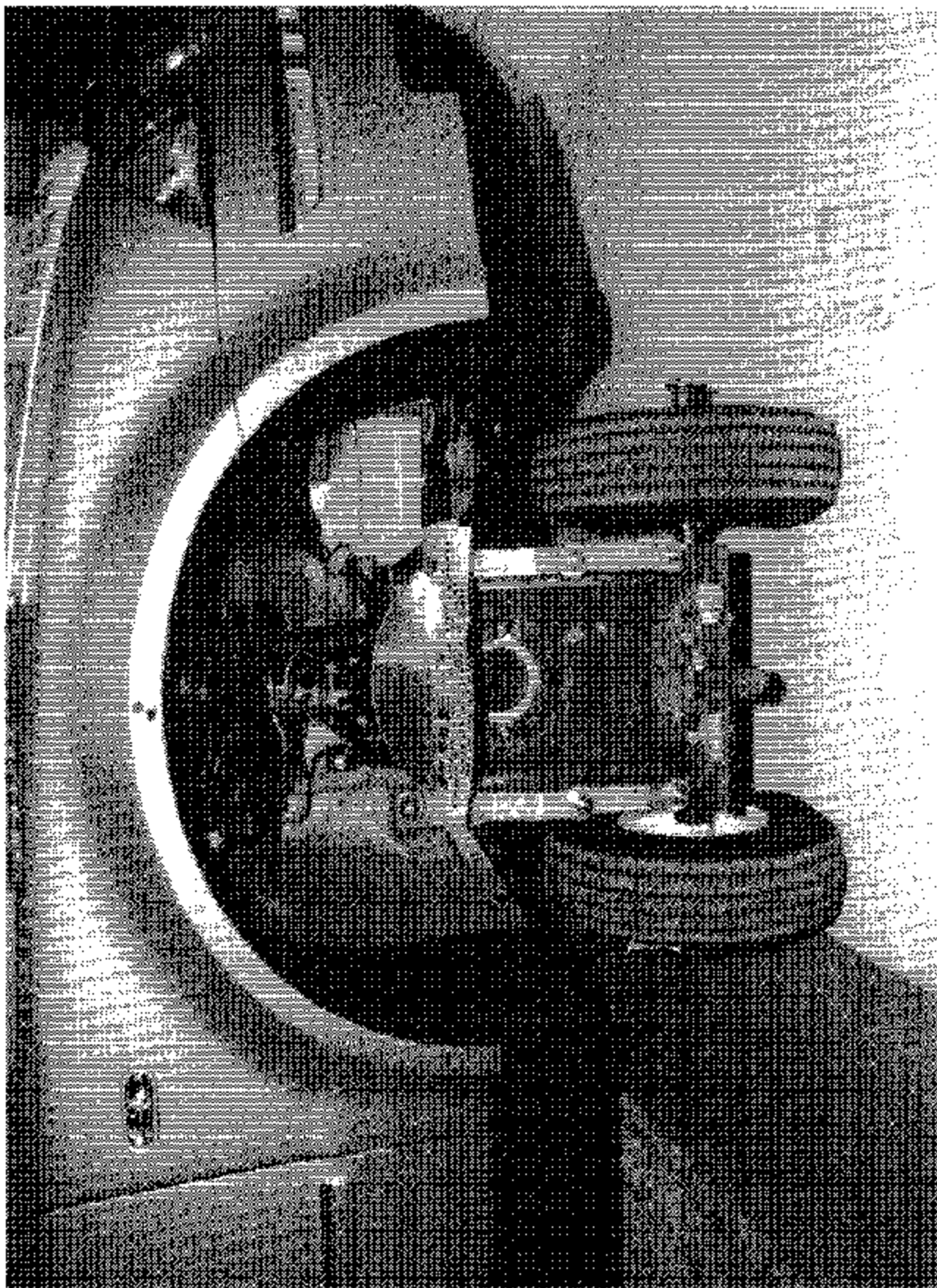
RIGID POLE SIDE IMPACT
FMVSS 201 C35802 03032601
VOLKSWAGEN PASSAT
MGA RESEARCH CORP.



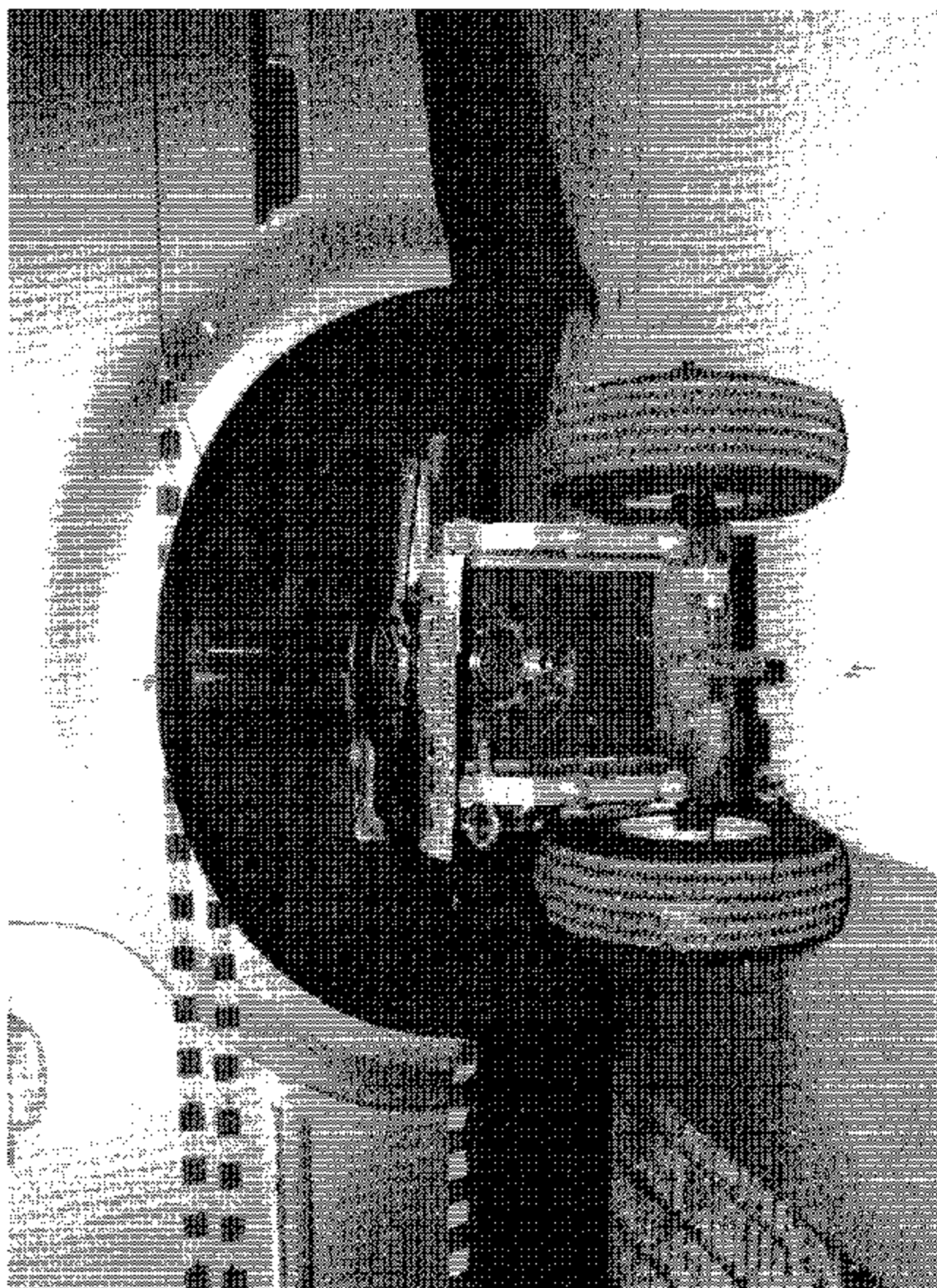
Pre-Test Fuel Filler Cap



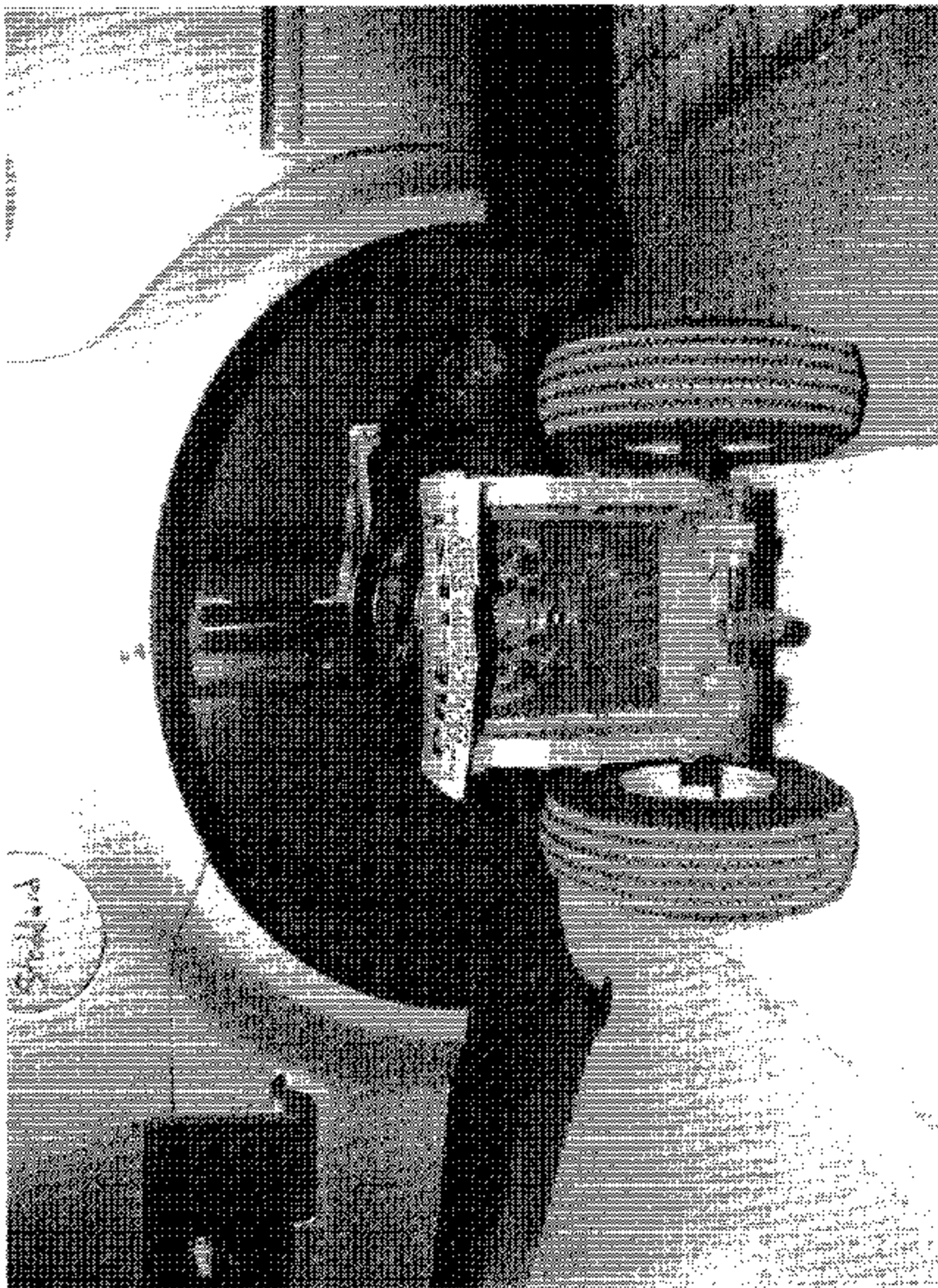
Pre-Test Left Front Wheel Dolly



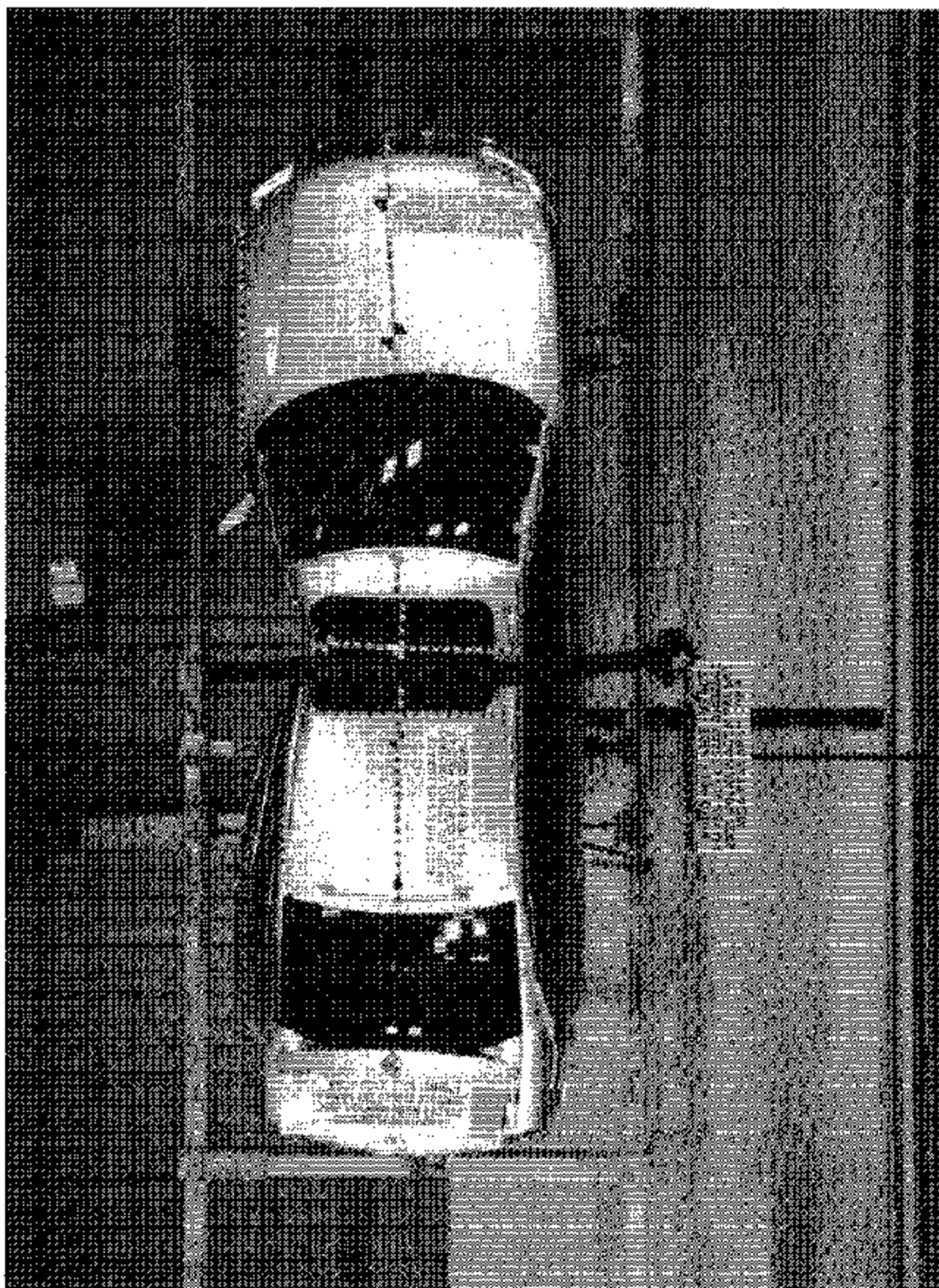
Pre-Test Right Front Wheel Dolly



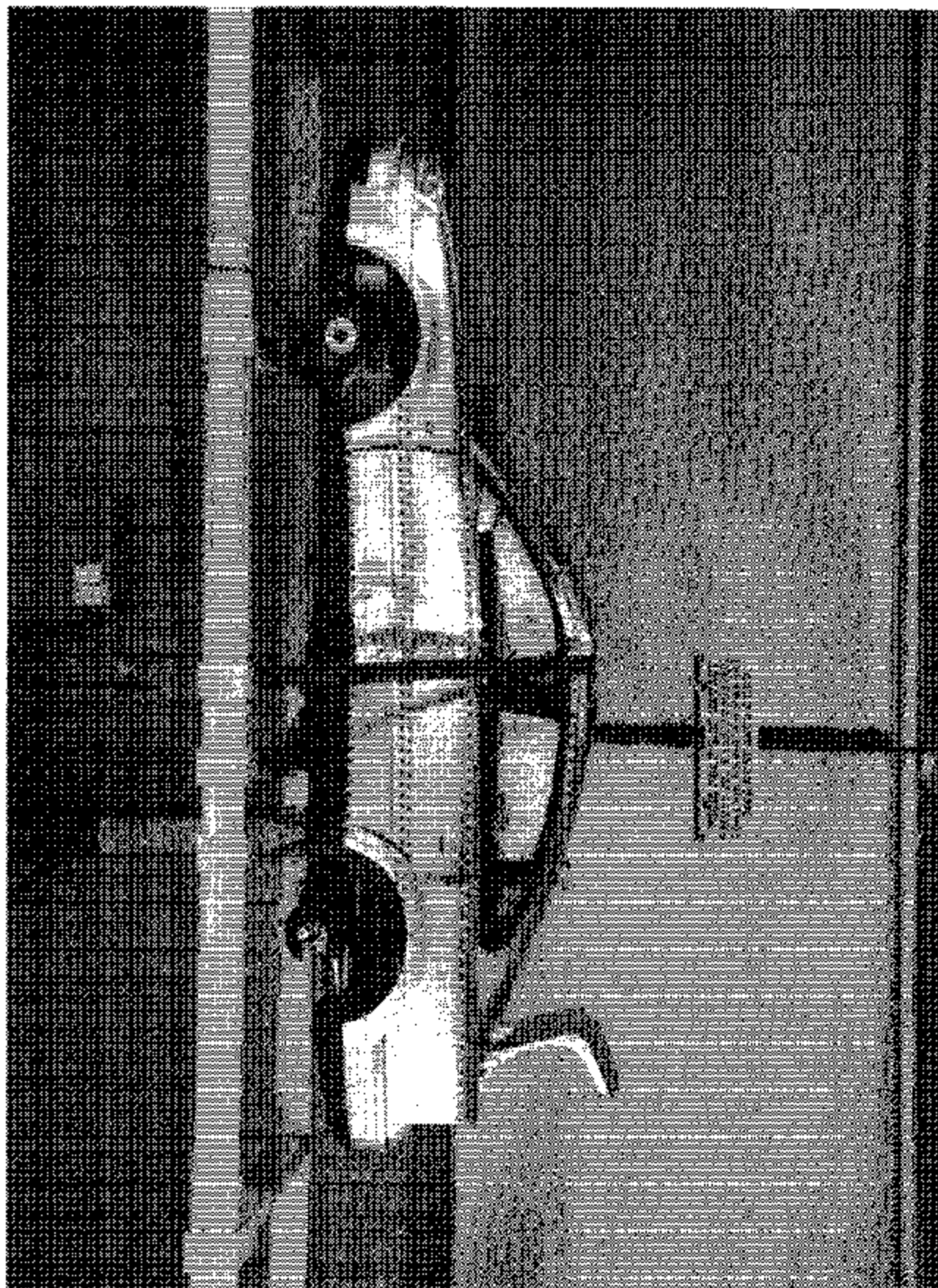
Pre-Test Left Rear Wheel Dolly



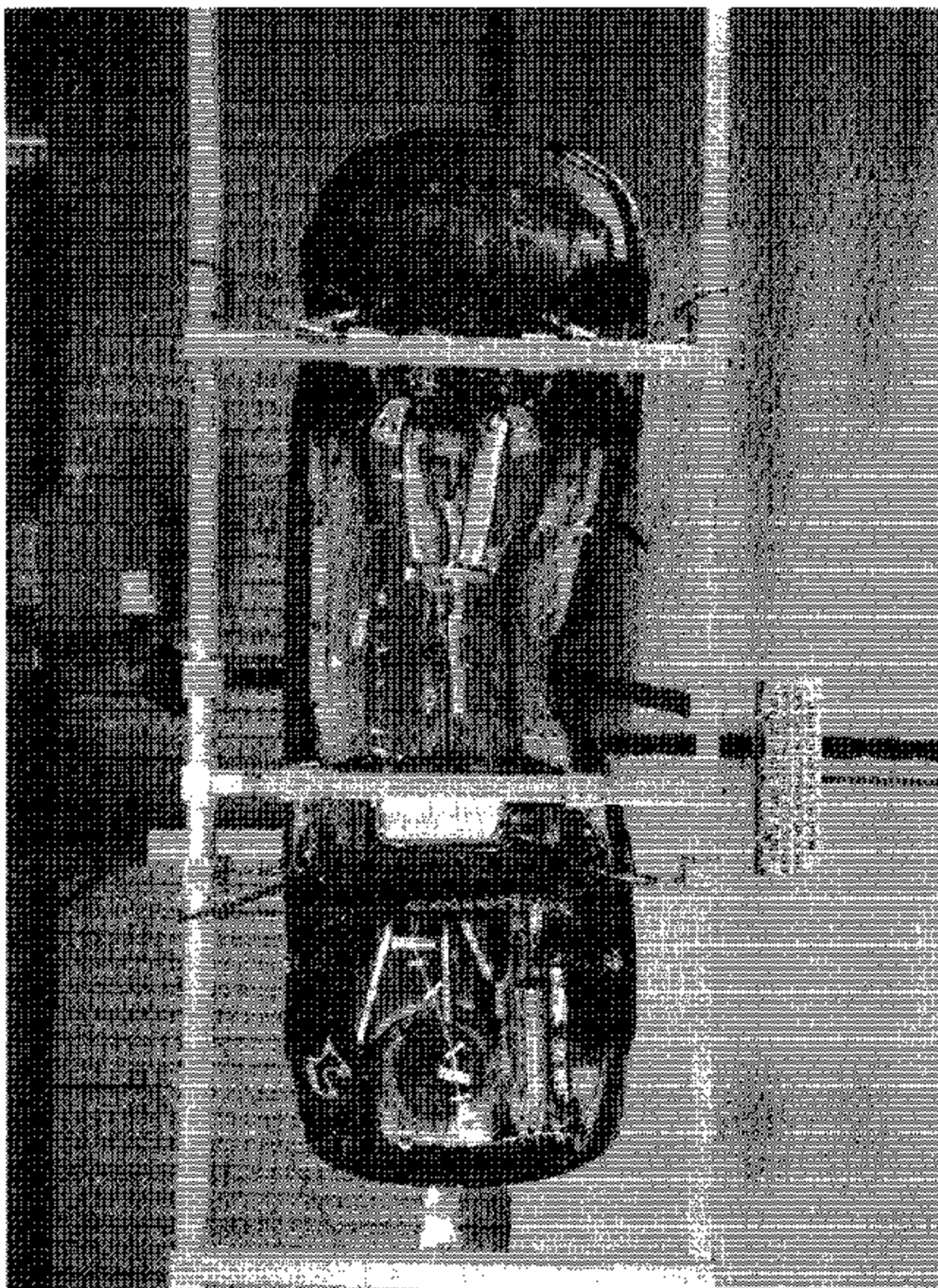
Pre-Test Right Rear Wheel Dolly



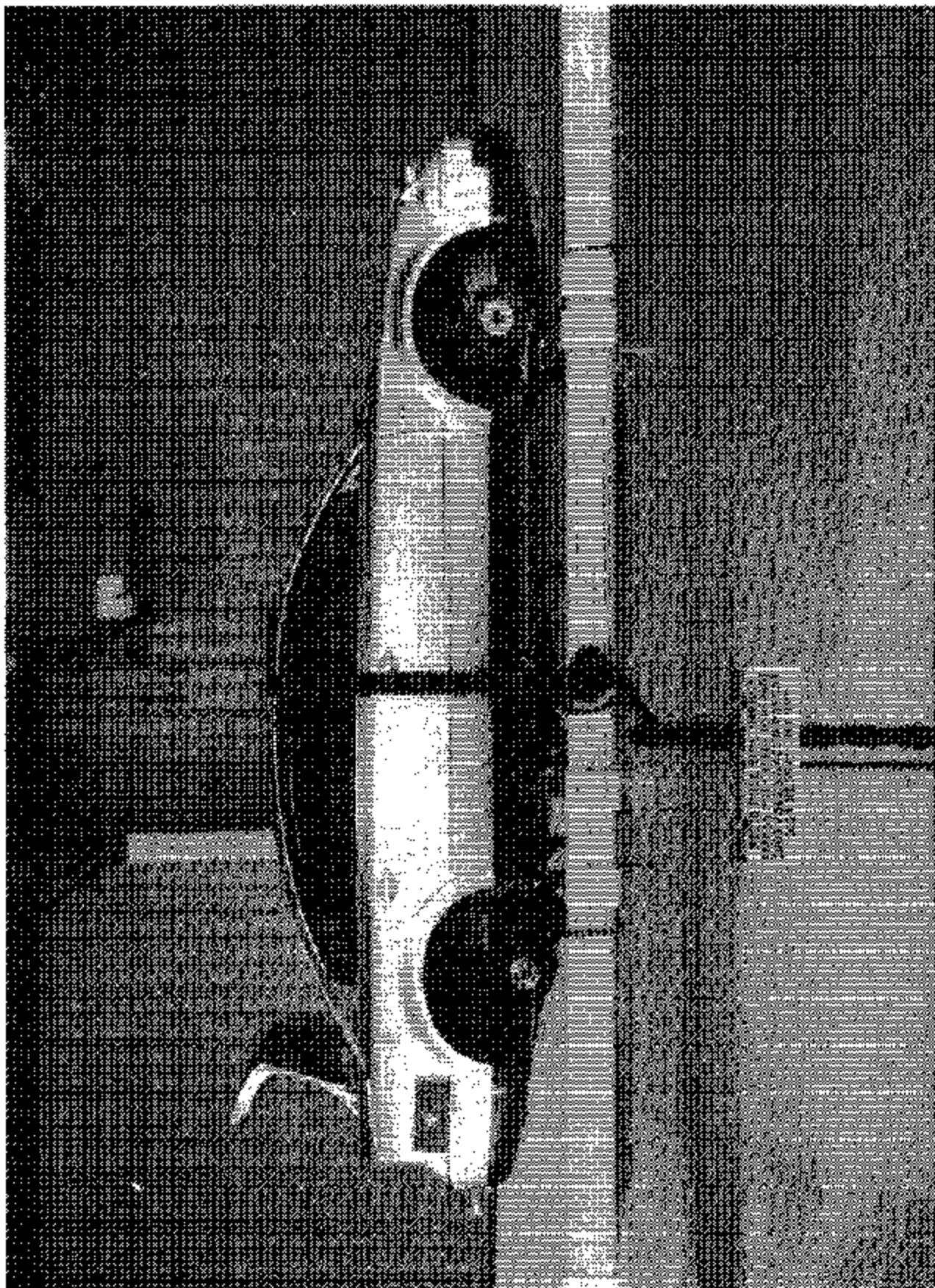
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Rollover 180 Degrees



Rollover 270 Degrees



Rollover 360 Degrees

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SID/HIII AND VEHICLE RESPONSE DATA

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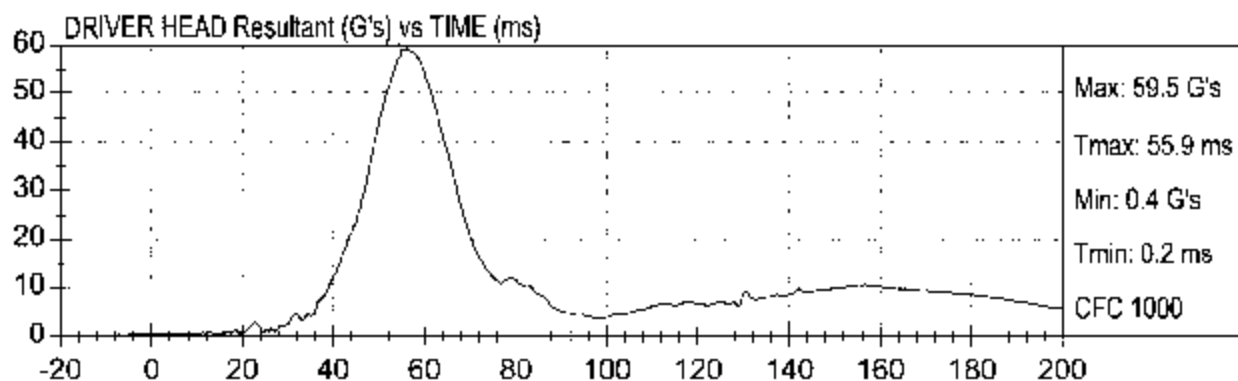
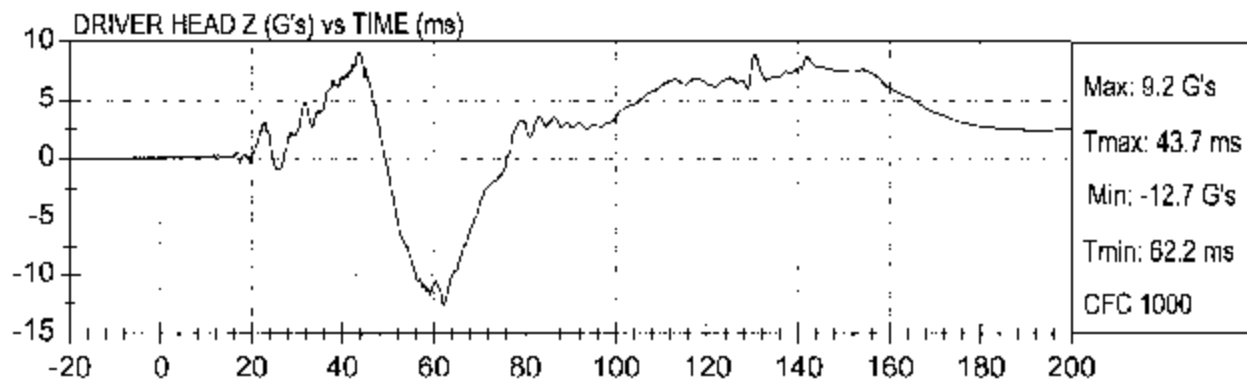
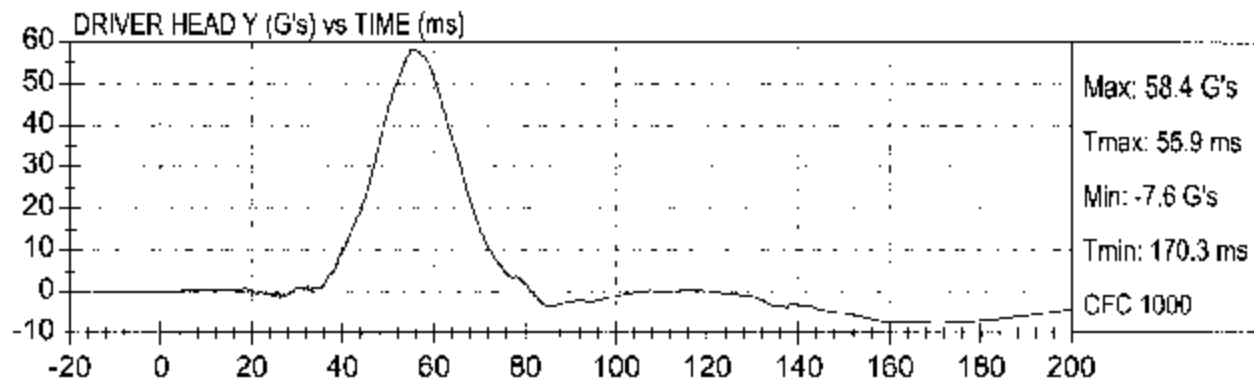
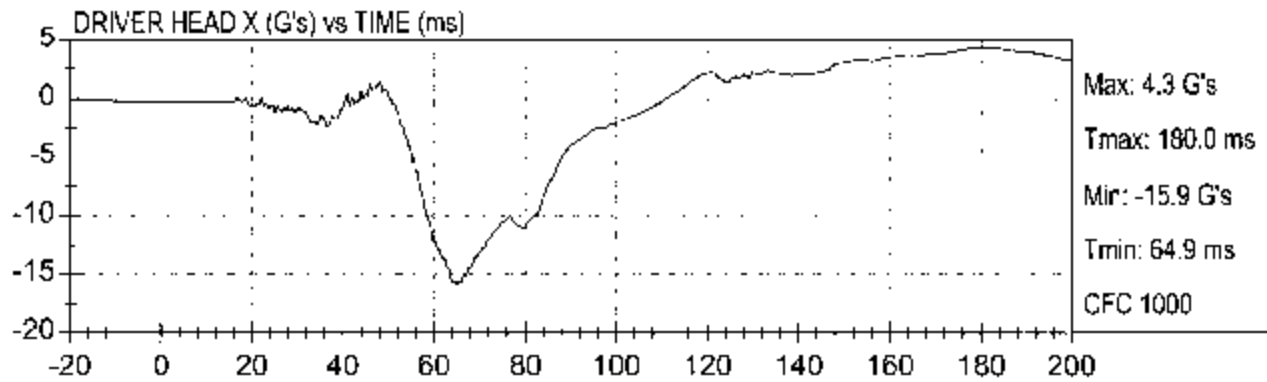
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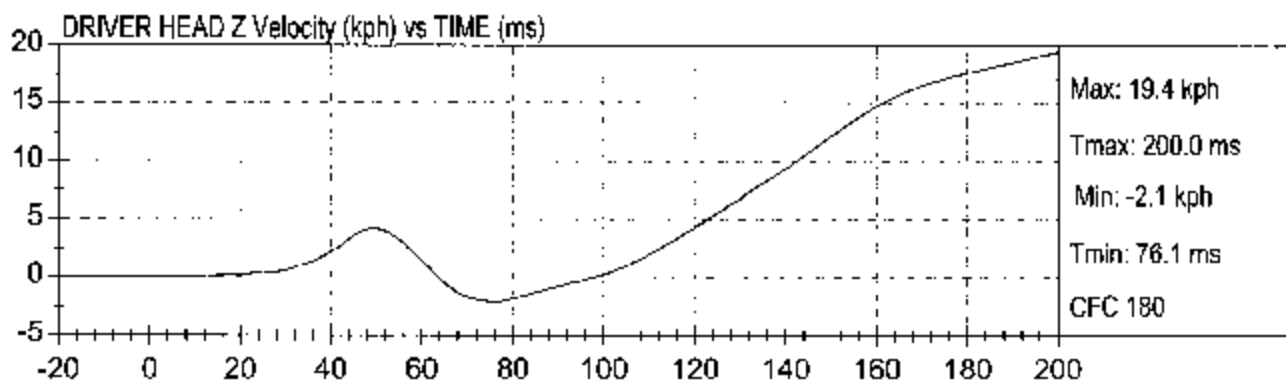
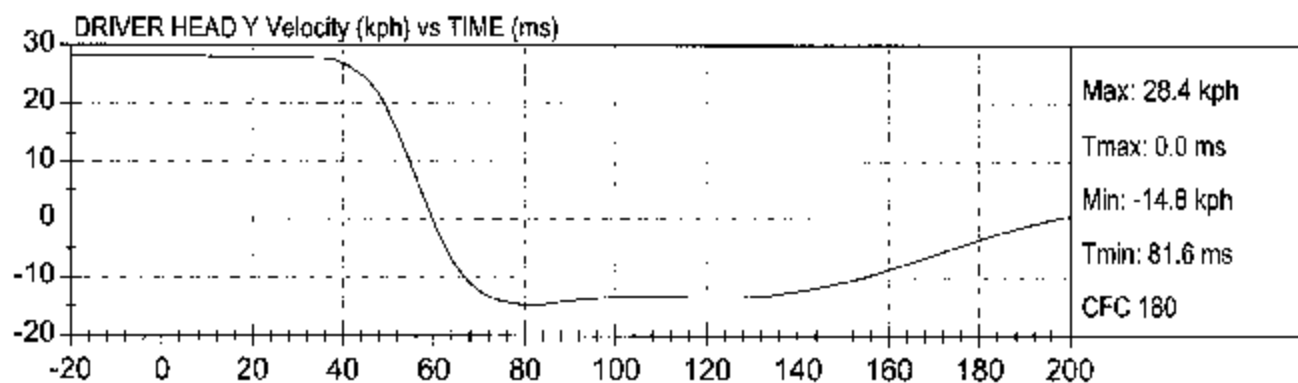
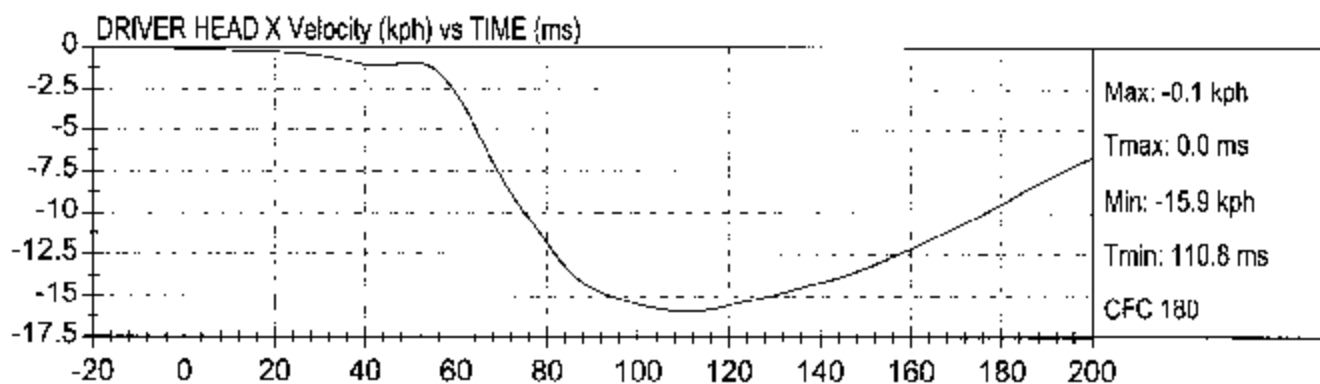
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Speed: 17.7 mph (28.5 km/h)





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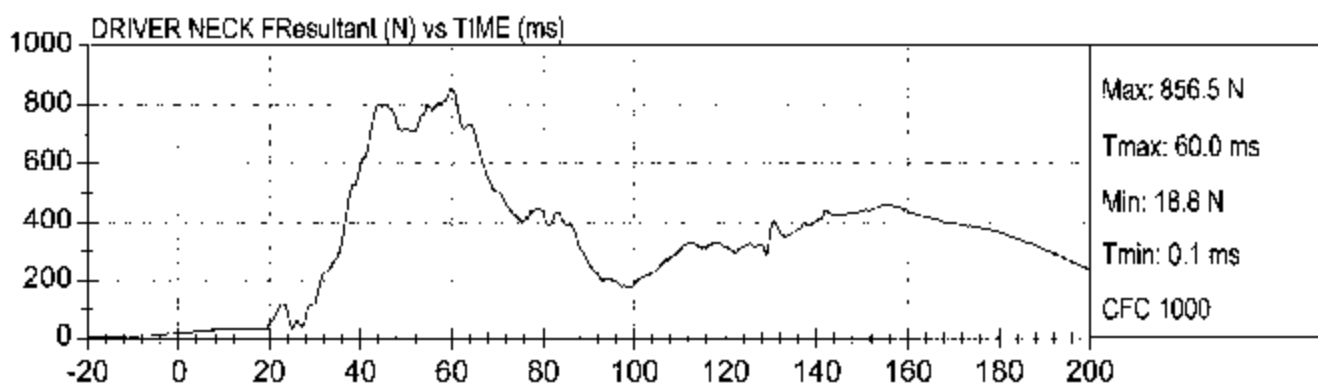
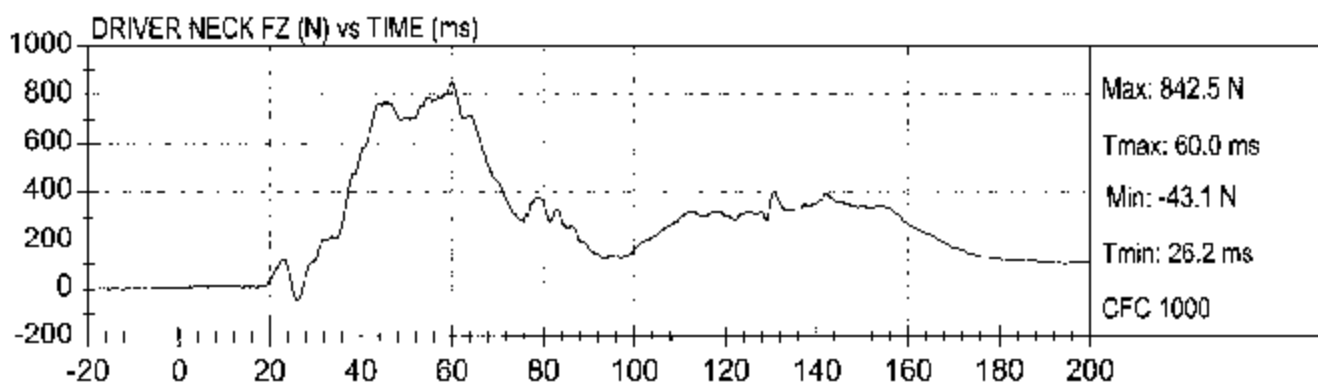
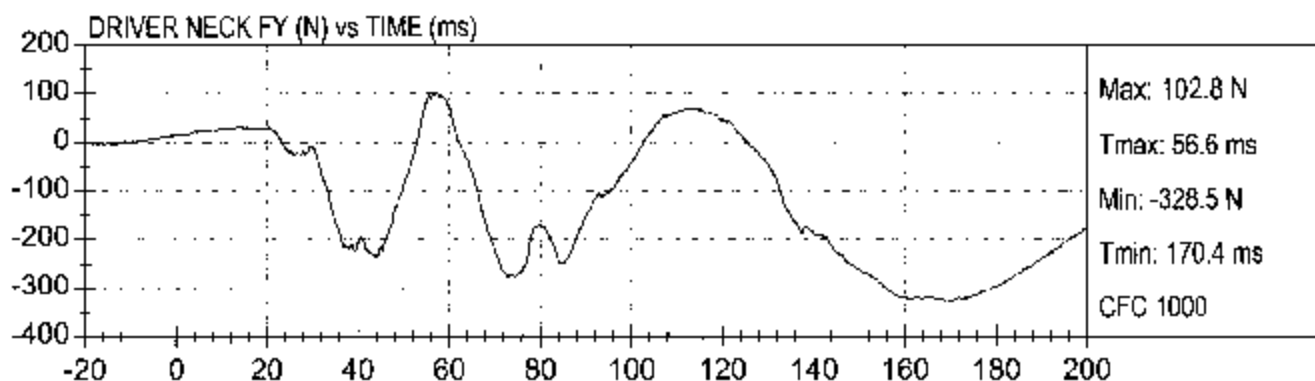
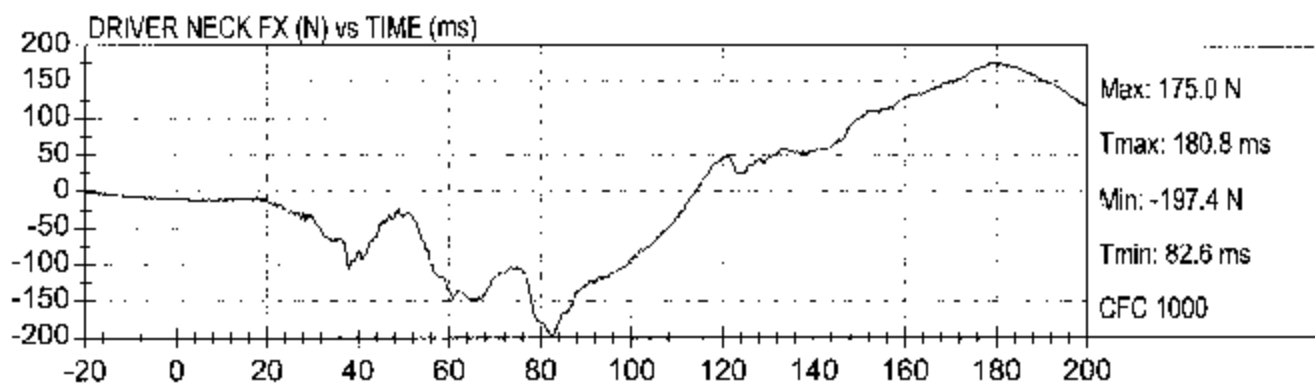
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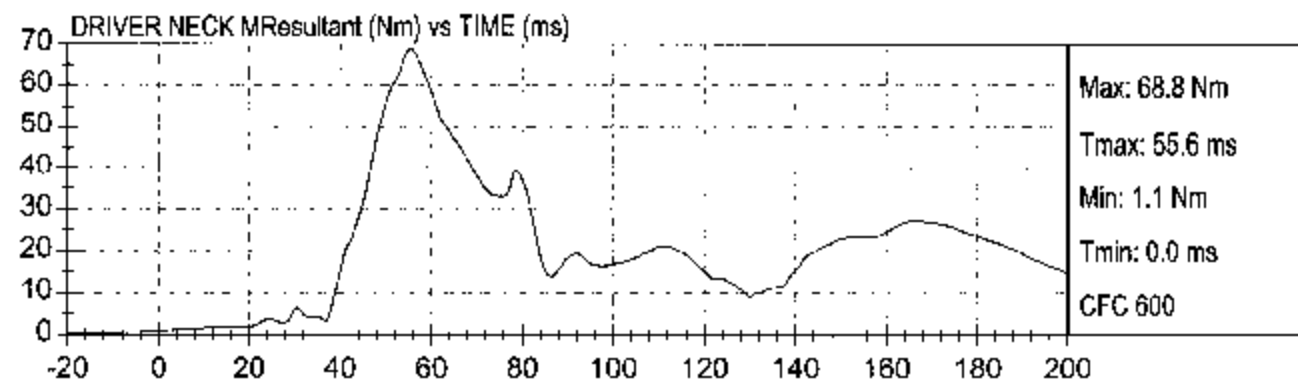
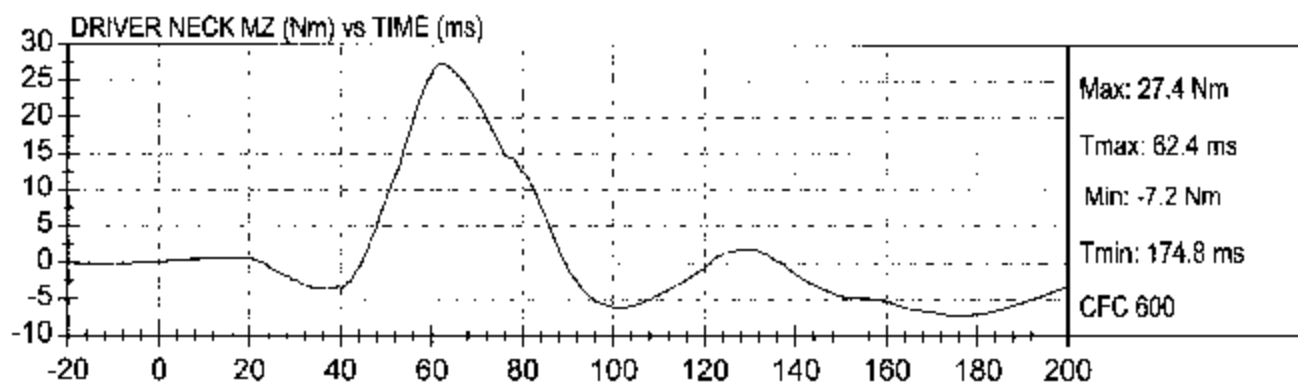
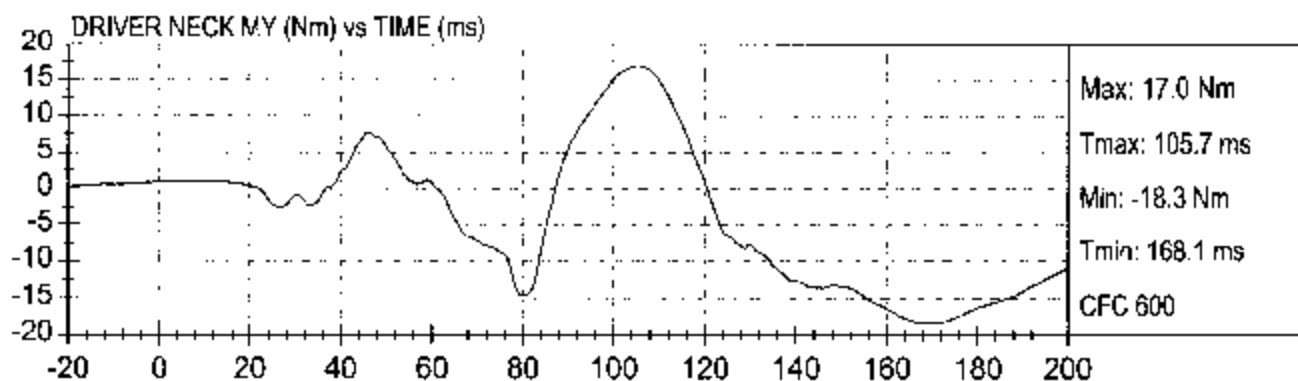
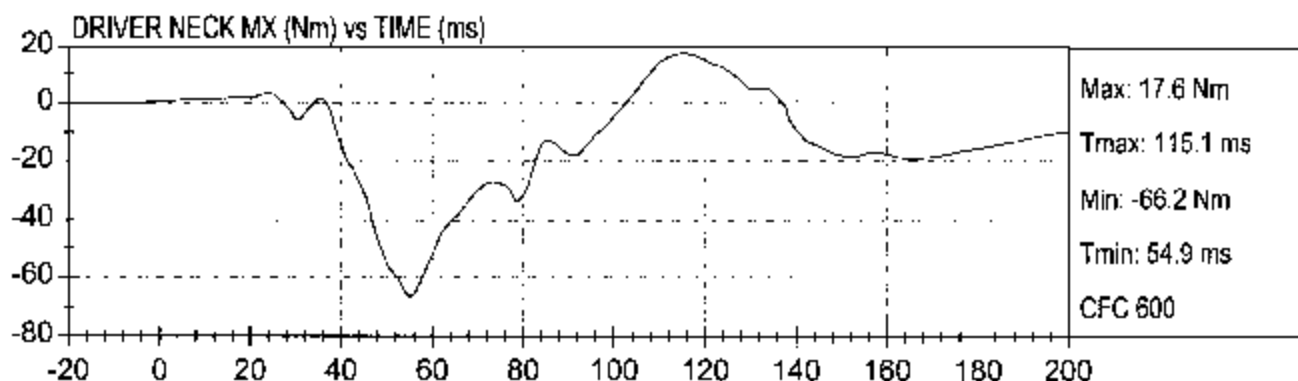
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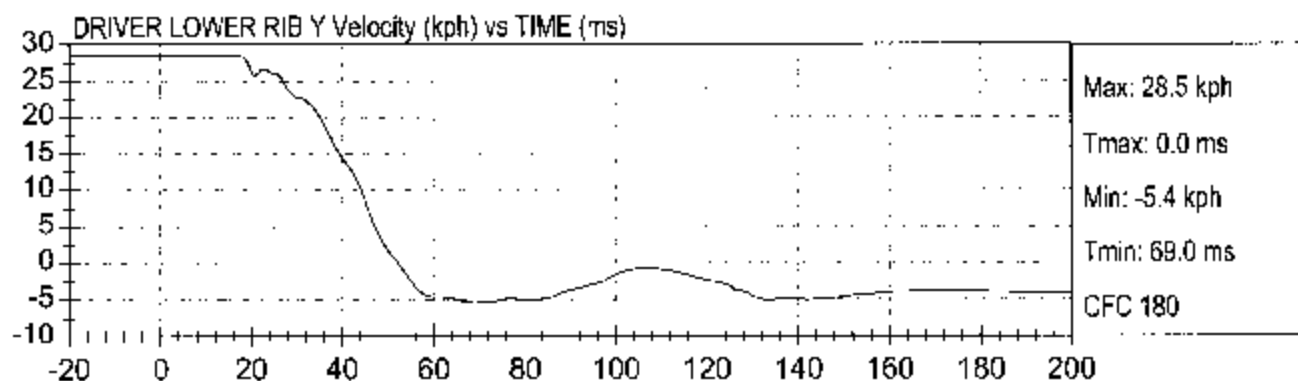
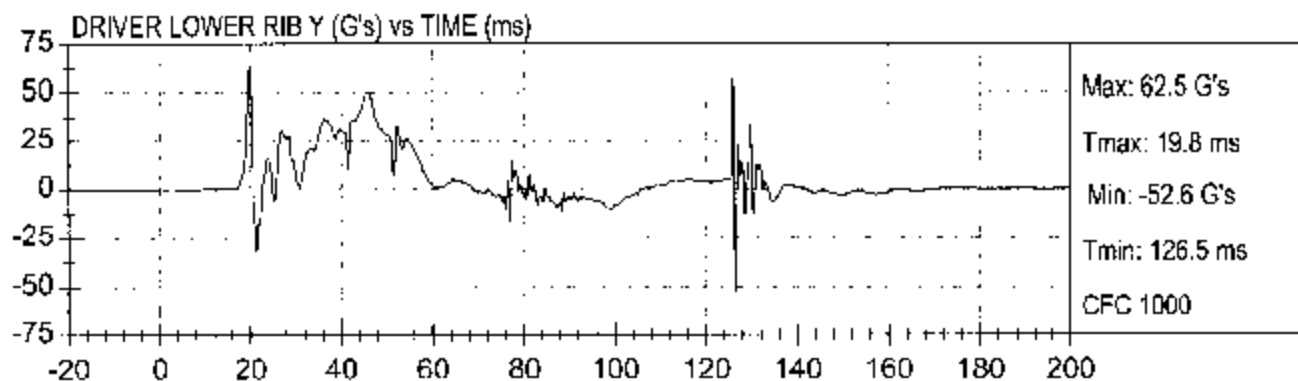
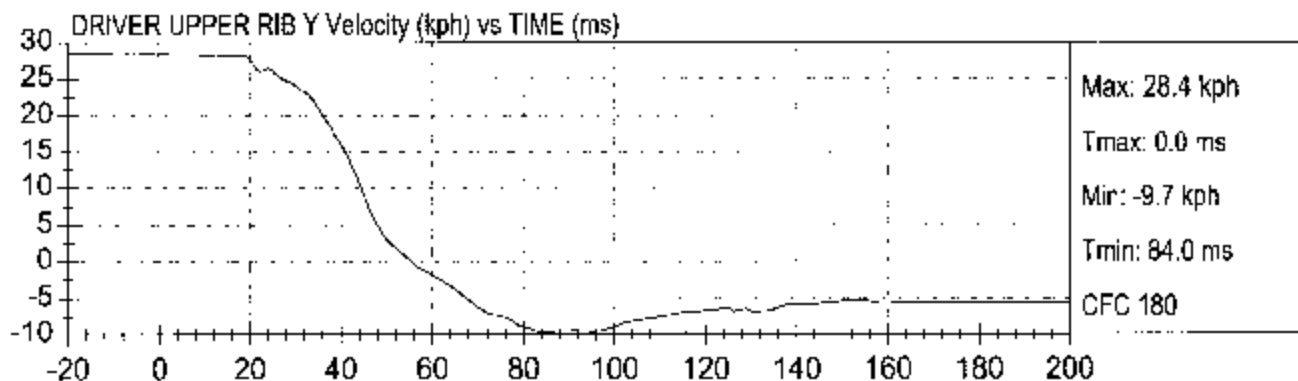
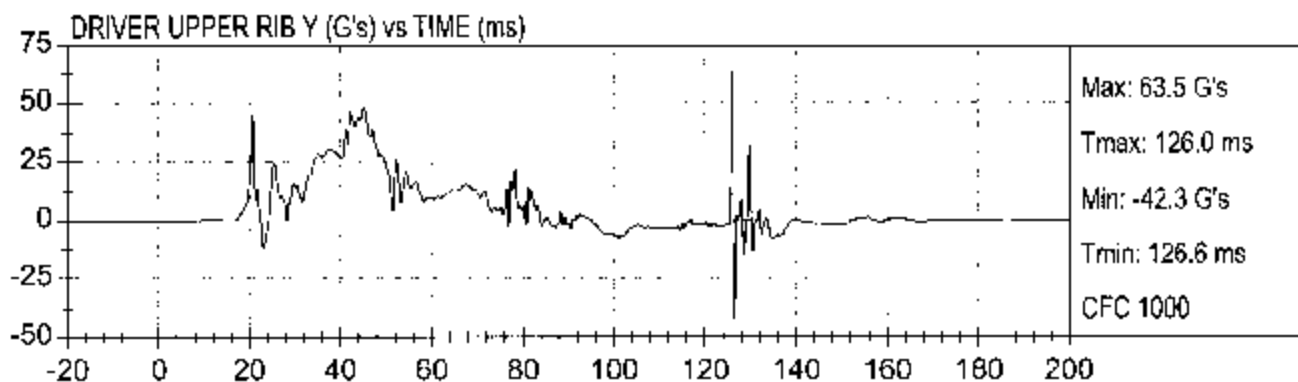




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Test Date: 3/26/2003
Speed: 17.7 mph (28.5 km/h)

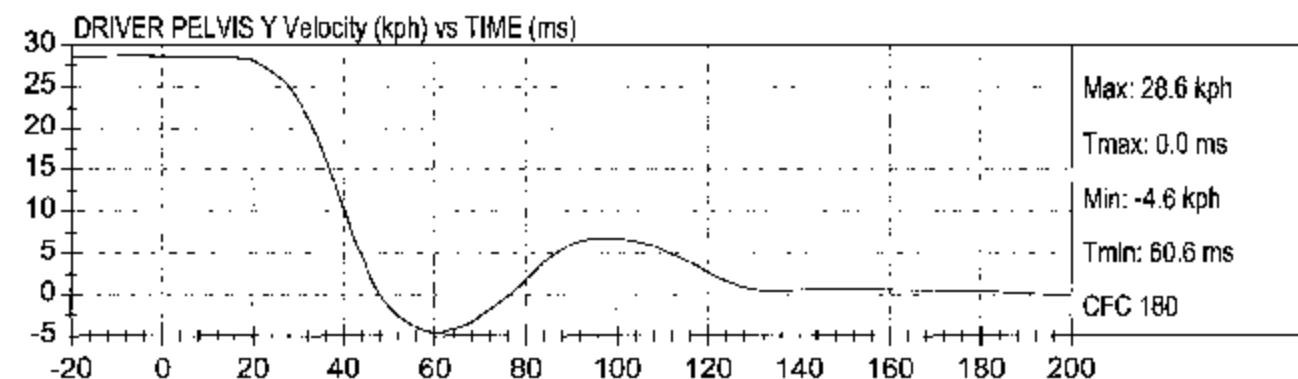
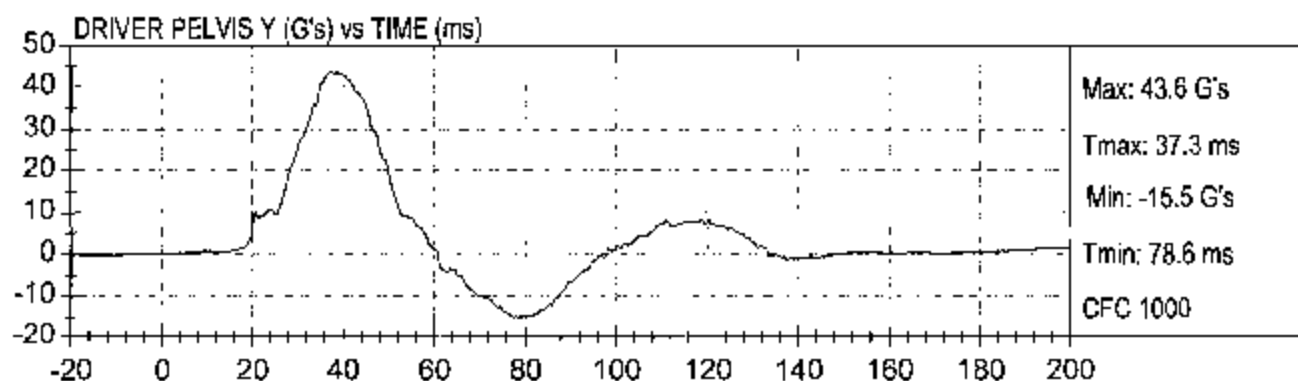
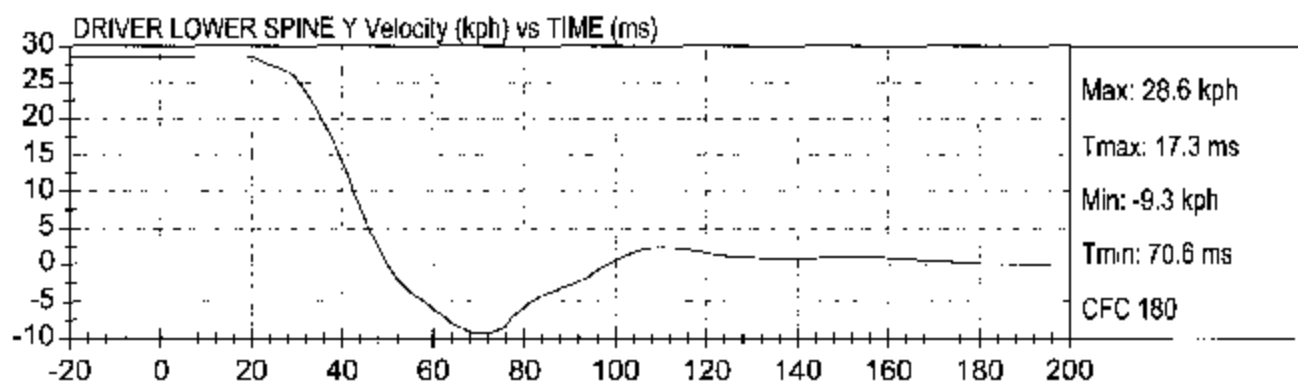
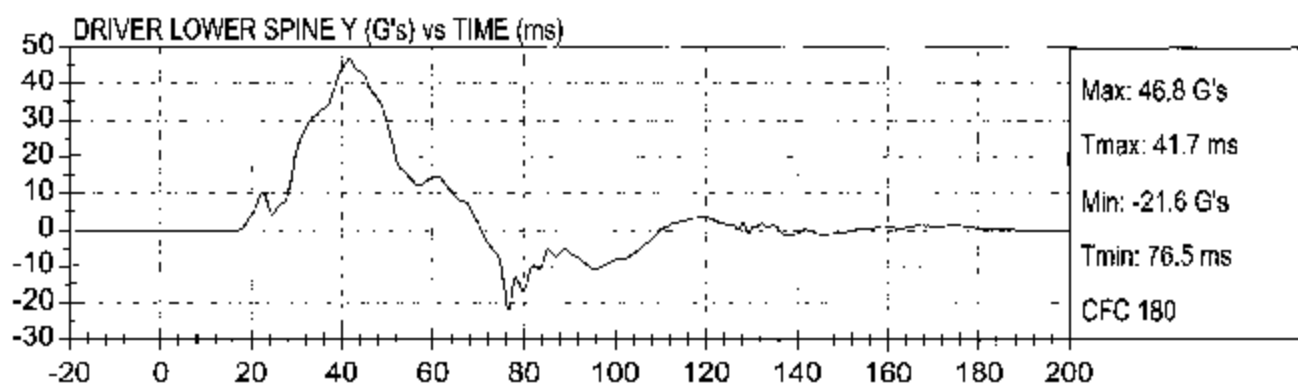


**mga**FMVSS 201P
2003 Volkswagen Passat C35802Test Date: 3/26/2003
Speed: 17.7 mph (28.5 km/h)



FMVSS 201P
2003 Volkswagen Passat C35802

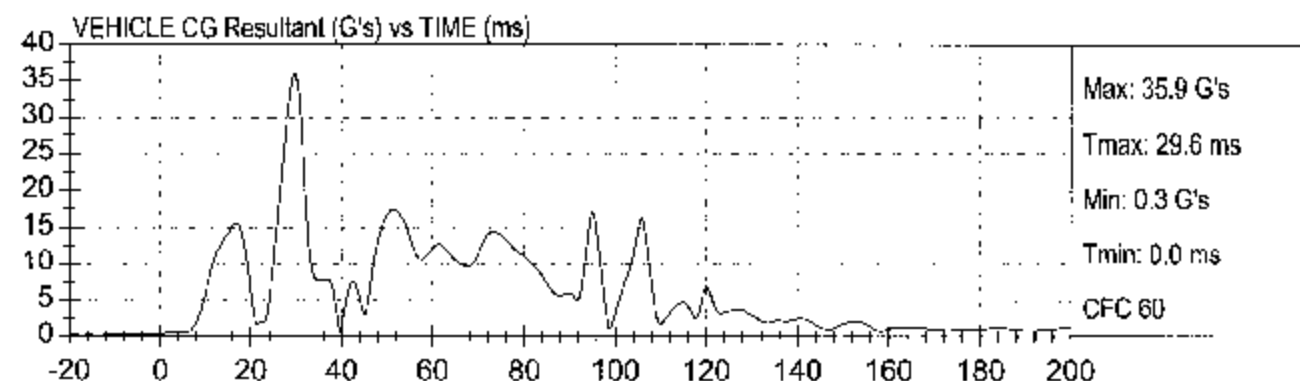
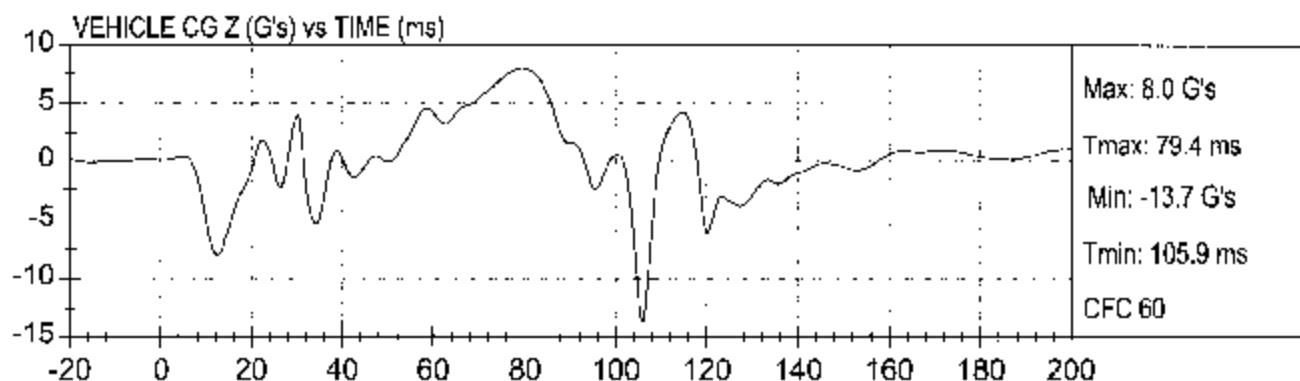
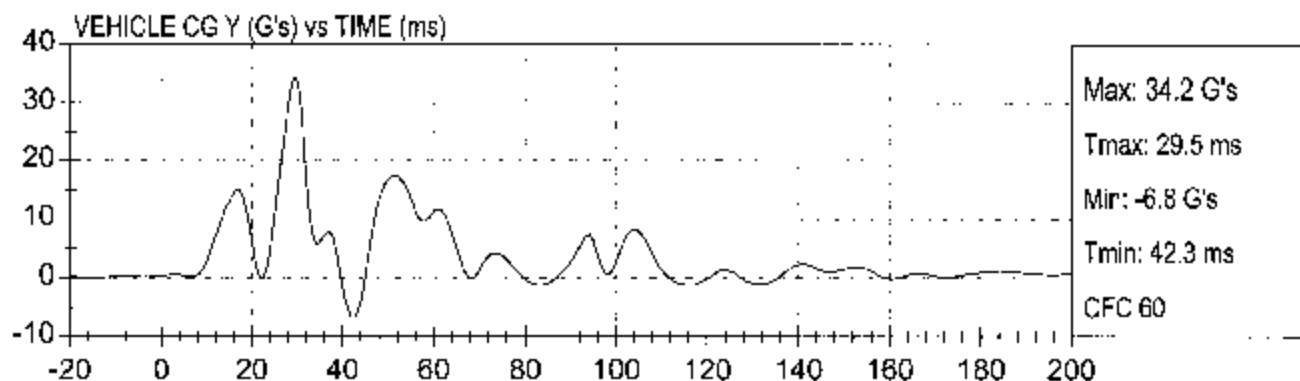
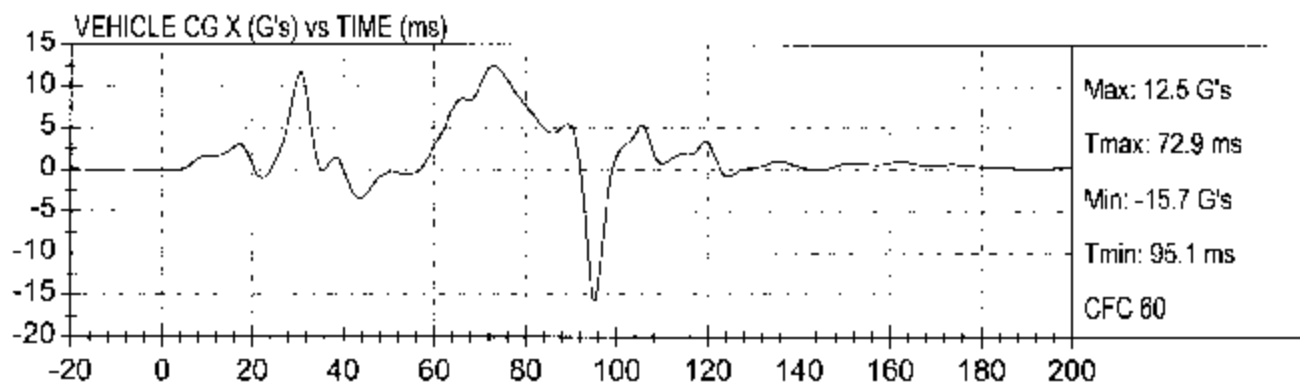
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Speed: 17.7 mph (28.5 km/h)





FMVSS 201P
2003 Volkswagen Passat C35802

Test Date: 3/26/2003
Speed: 17.7 mph (28.5 km/h)

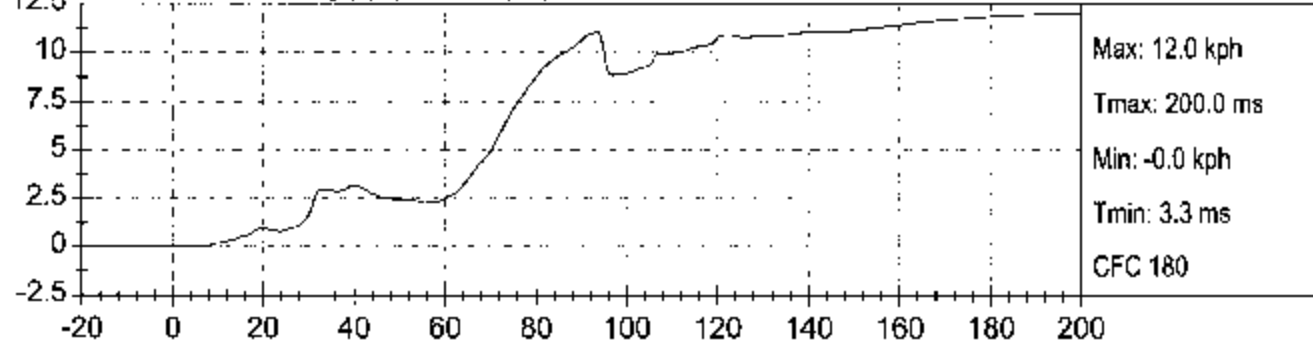




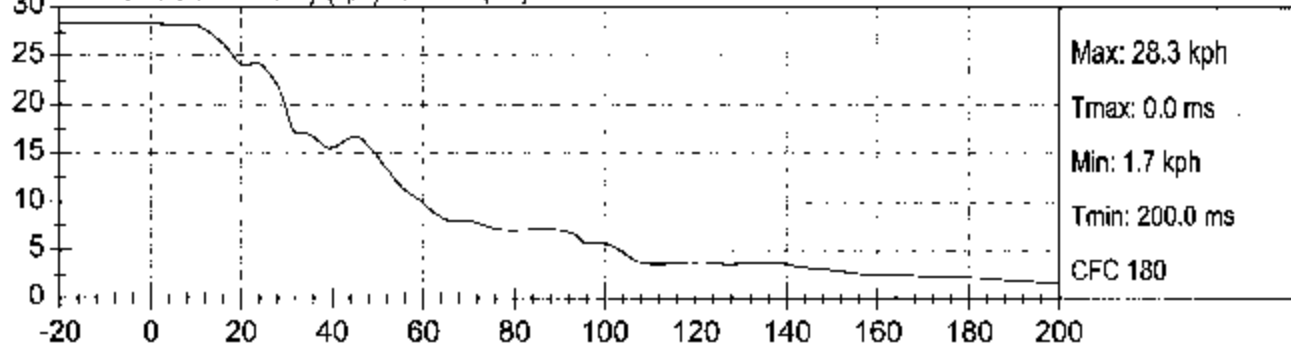
FMVSS 201P
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Test Date: 3/26/2003
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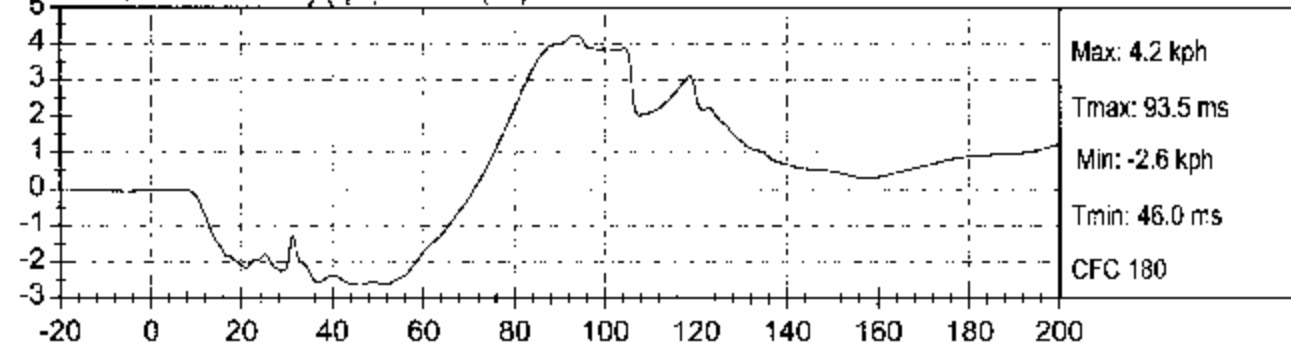
VEHICLE CG X Velocity (kph) vs TIME (ms)



VEHICLE CG Y Velocity (kph) vs TIME (ms)



VEHICLE CG Z Velocity (kph) vs TIME (ms)

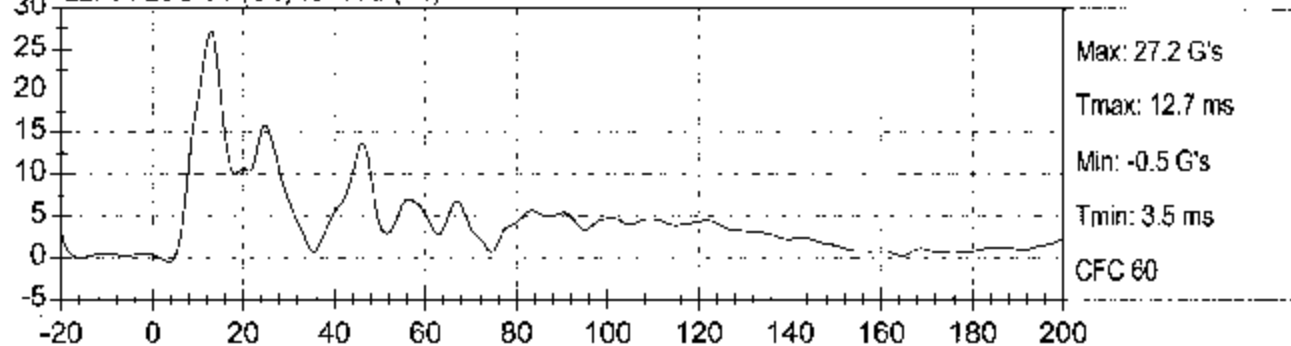




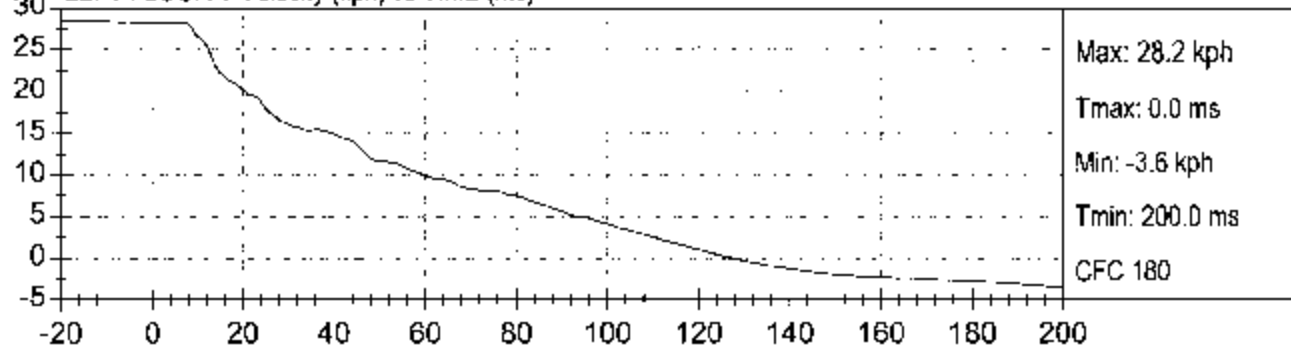
FMVSS 201P
2003 Volkswagen Passat C35802

Test Date: 3/26/2003
Speed: 17.7 mph (28.5 km/h)

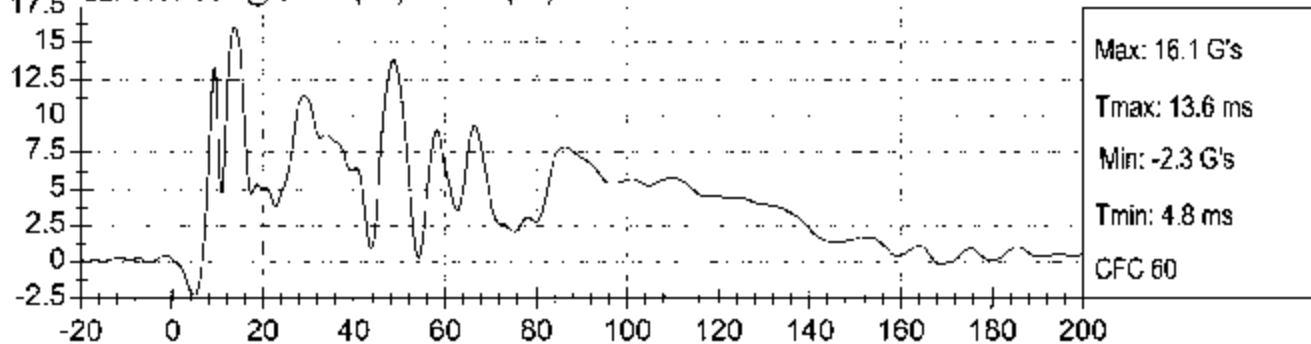
LEFT FLOOR Y (G's) vs TIME (ms)



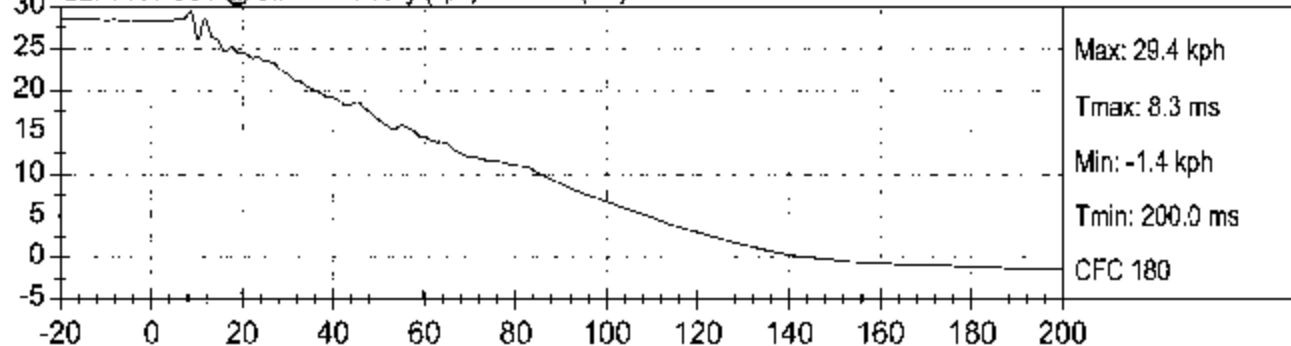
LEFT FLOOR Y Velocity (kph) vs TIME (ms)



LEFT A-POST @ SILL Y (G's) vs TIME (ms)



LEFT A-POST @ SILL Y Velocity (kph) vs TIME (ms)

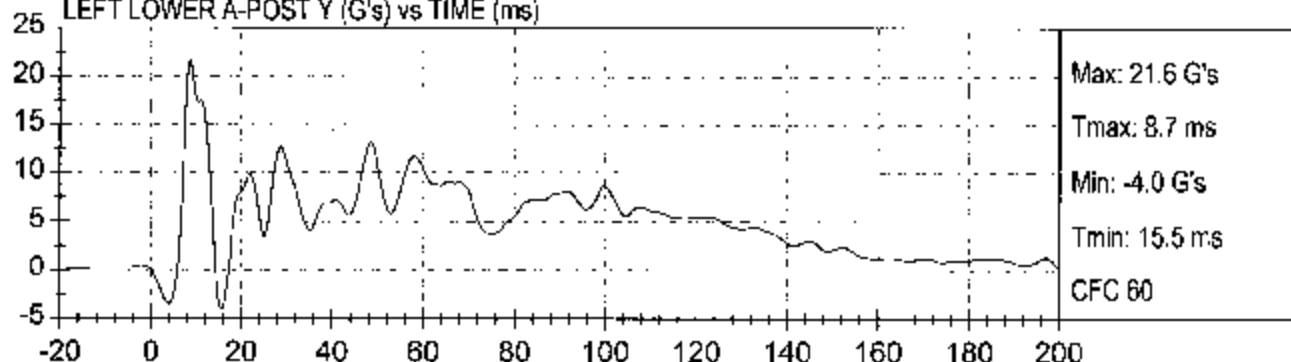




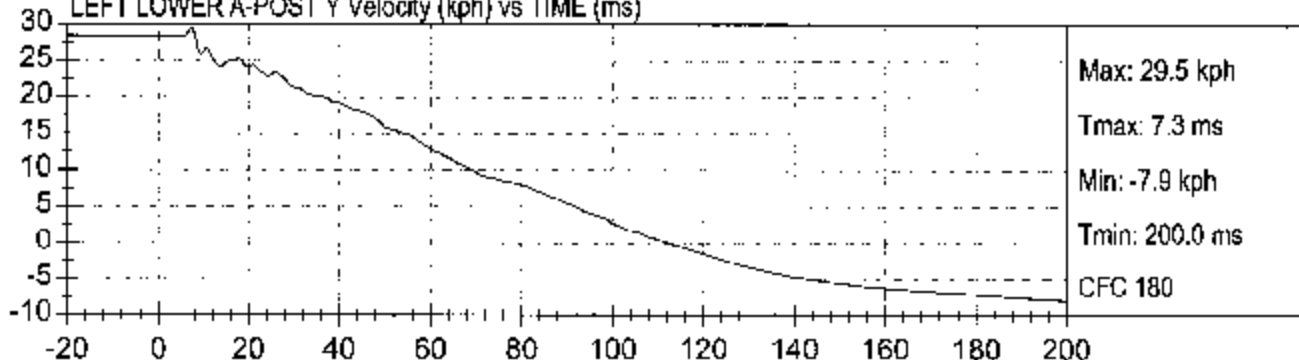
FMVSS 201P
2003 Volkswagen Passat C35802

Test Date: 3/26/2003
Speed: 17.7 mph (28.5 km/h)

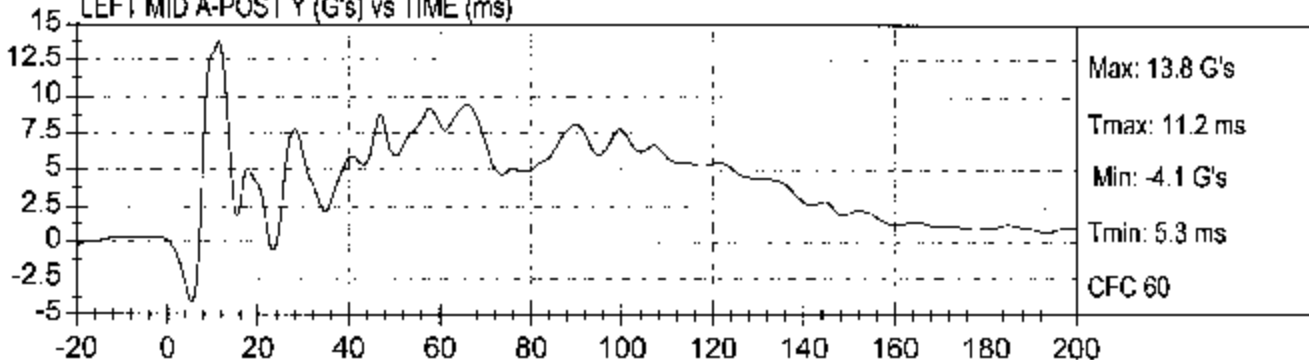
LEFT LOWER A-POST Y (G's) vs TIME (ms)



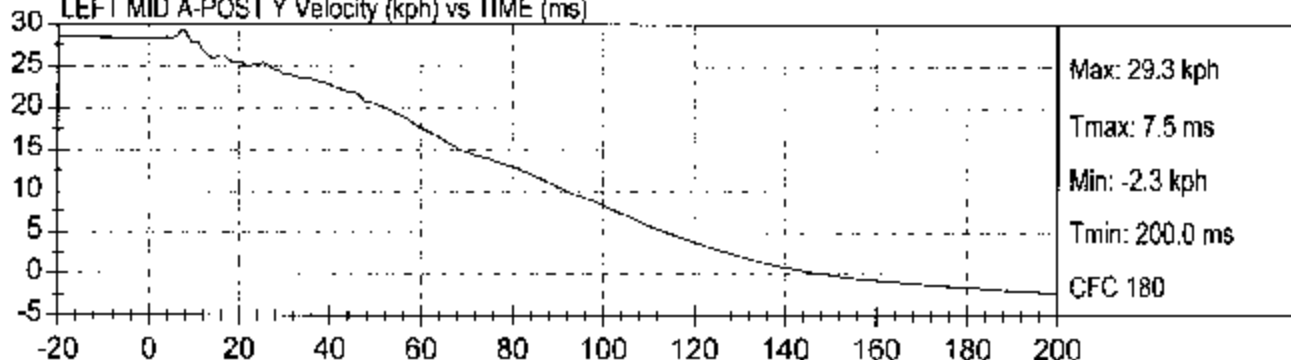
LEFT LOWER A-POST Y Velocity (kph) vs TIME (ms)



LEFT MID A-POST Y (G's) vs TIME (ms)



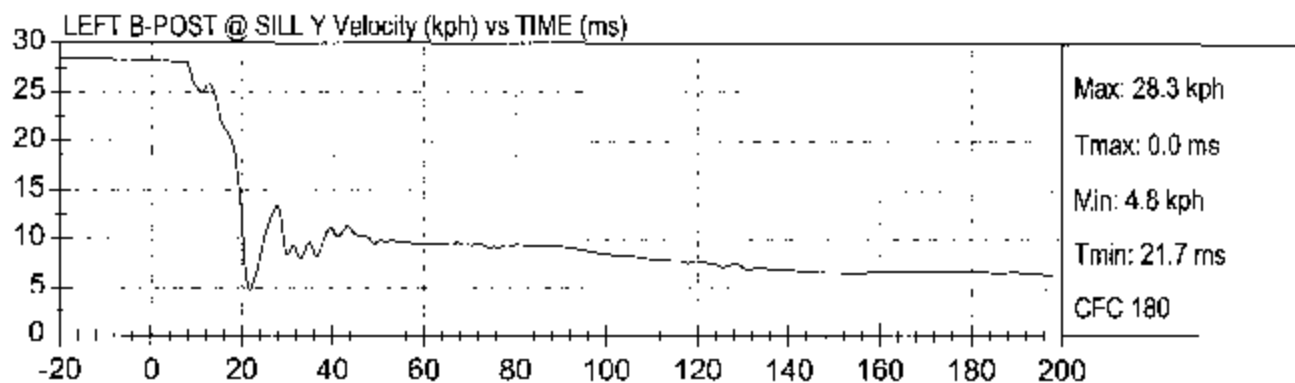
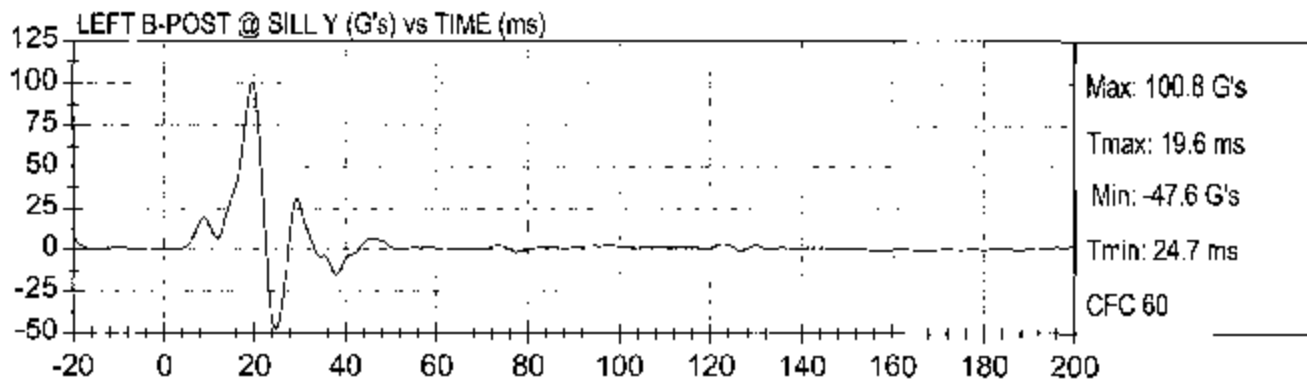
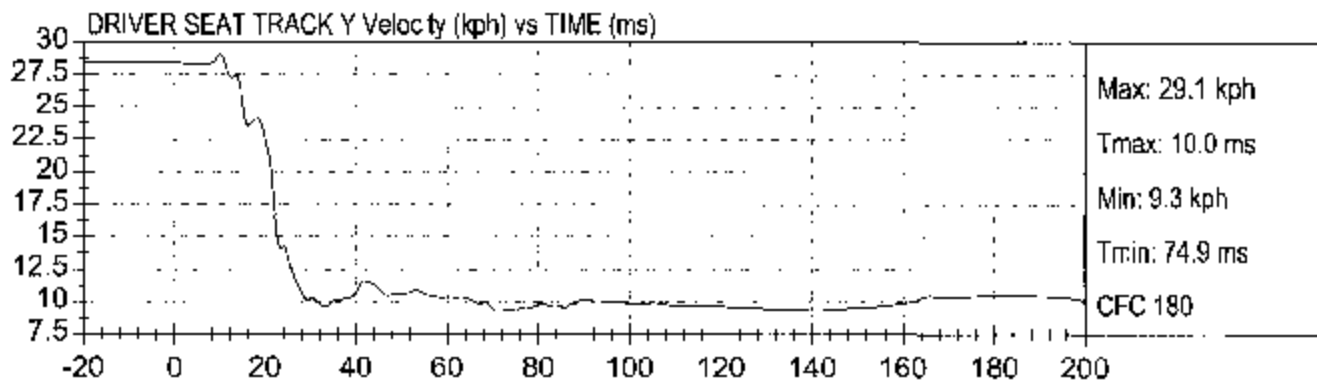
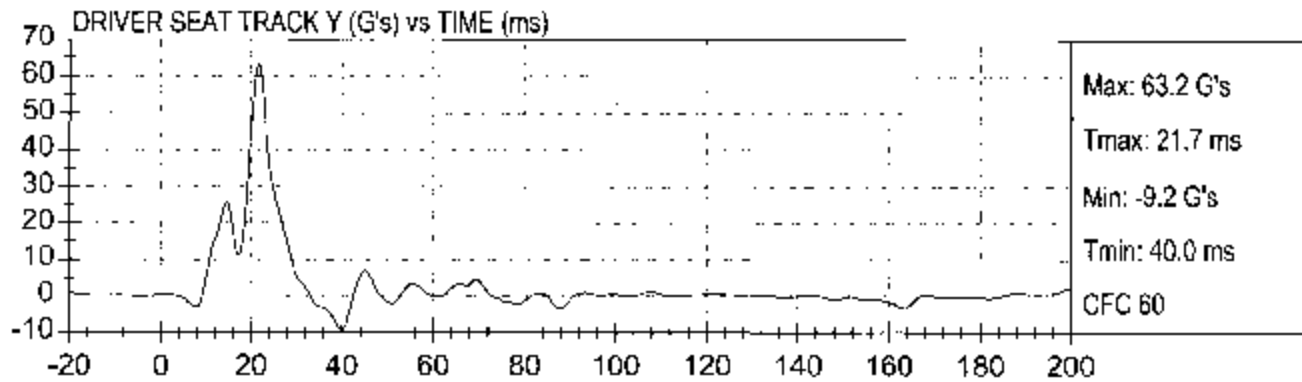
LEFT MID A-POST Y Velocity (kph) vs TIME (ms)





FMVSS 201P
2003 Volkswagen Passat C35802

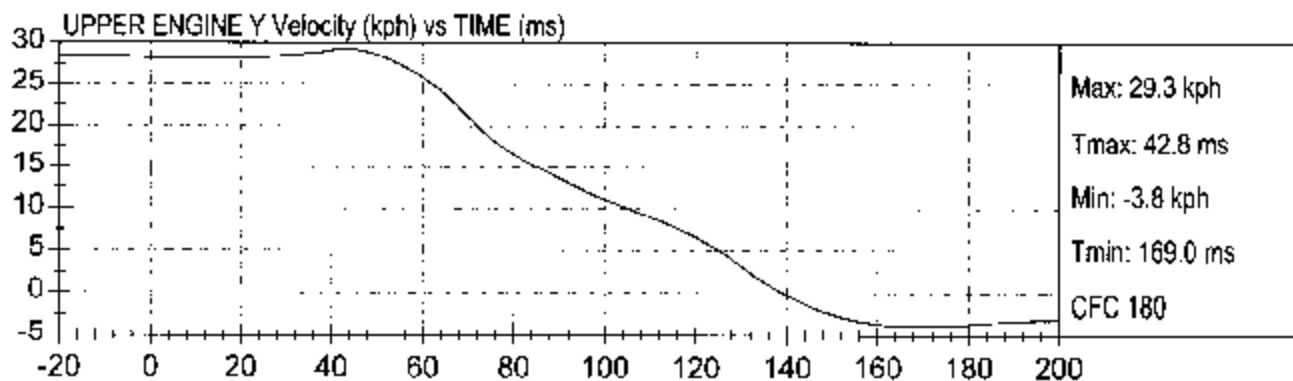
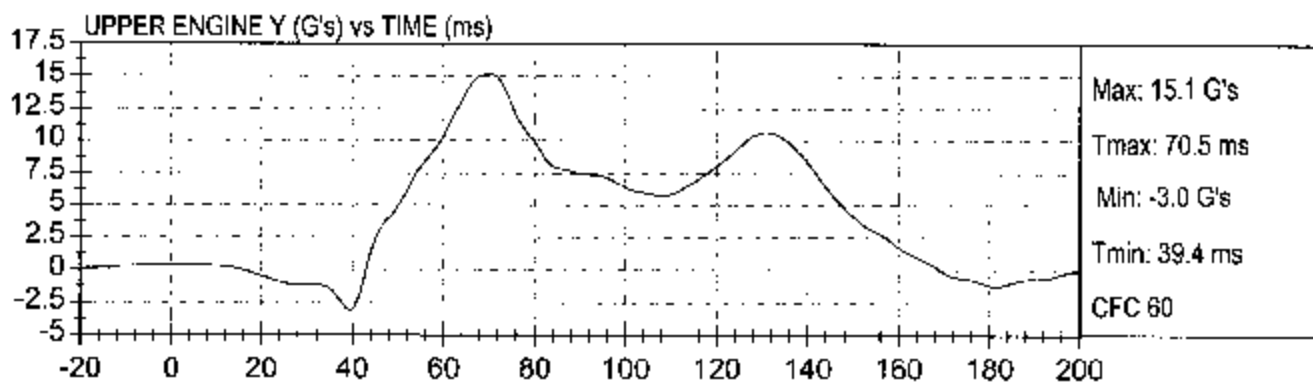
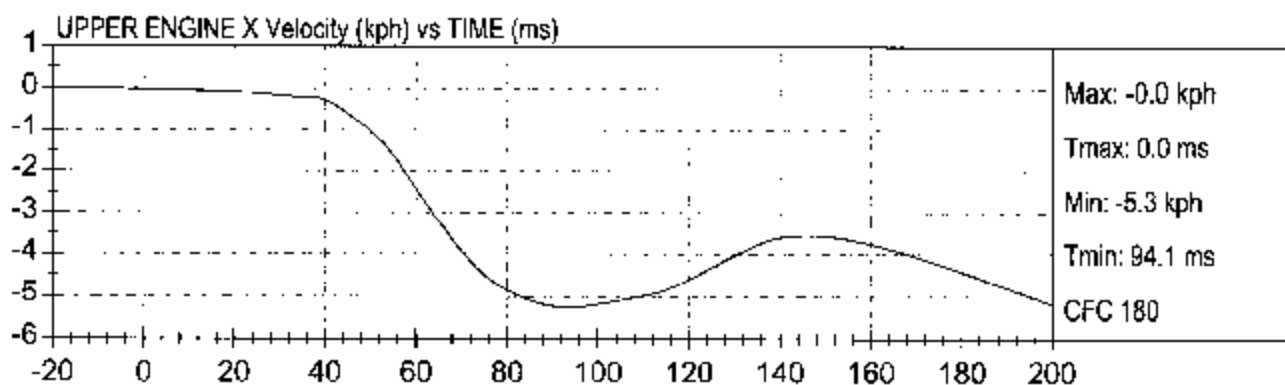
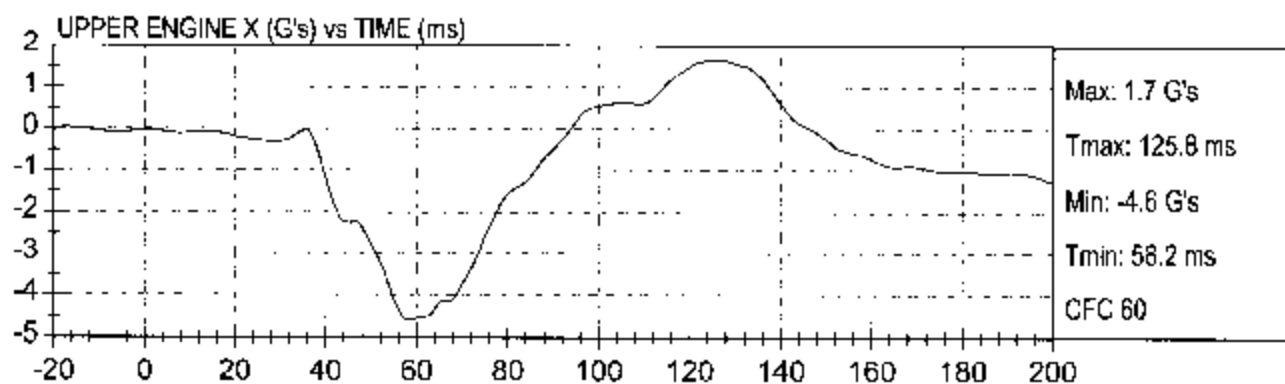
Test Date: 3/26/2003
Speed: 17.7 mph (28.5 km/h)





FMVSS 201P
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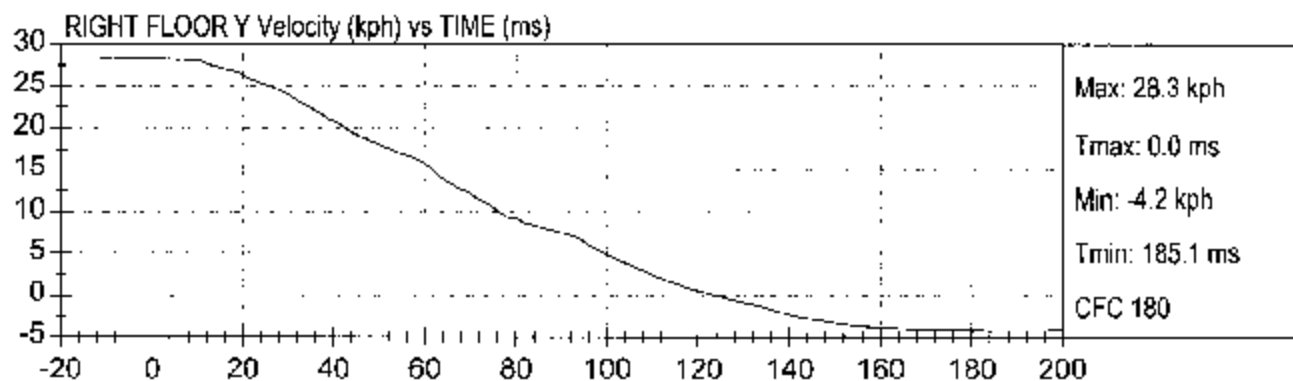
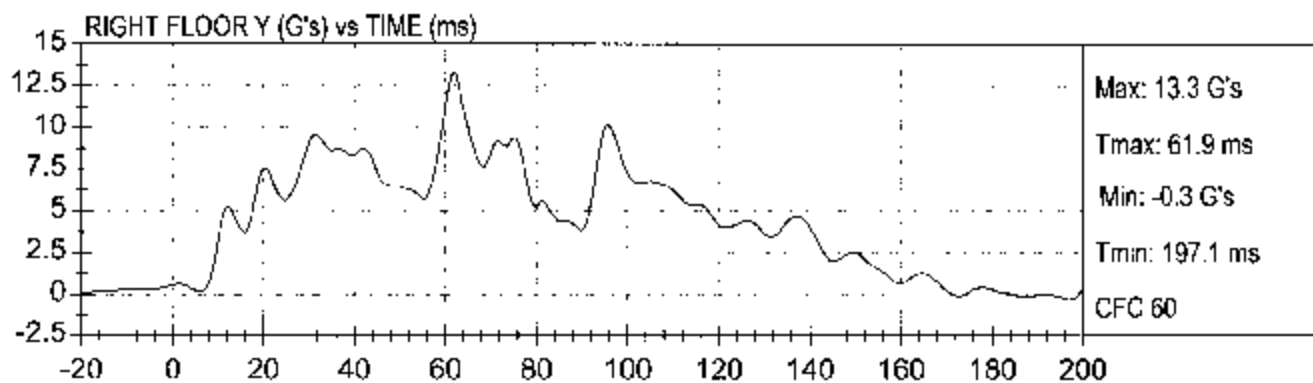
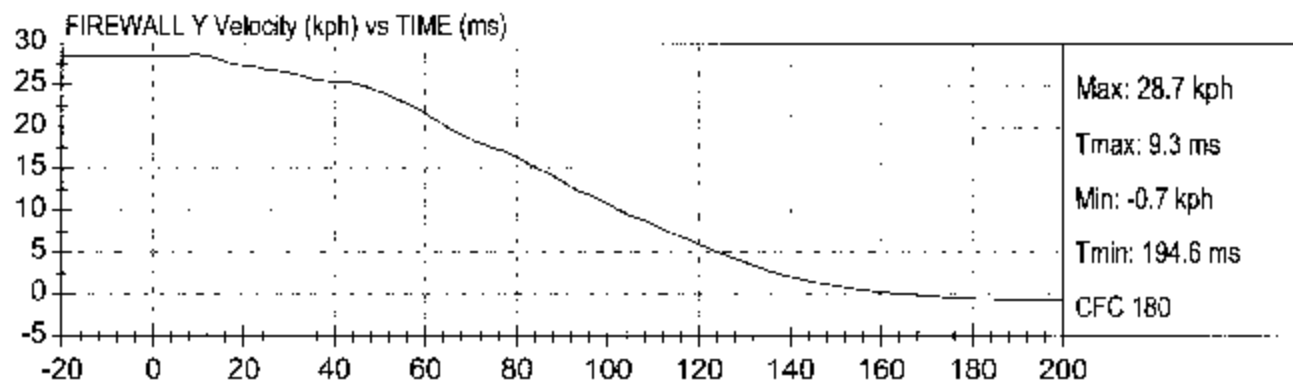
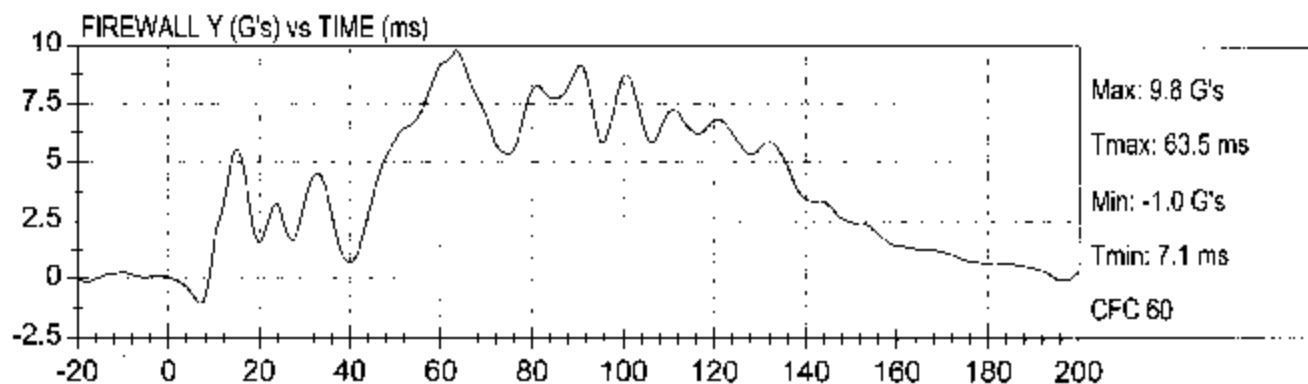
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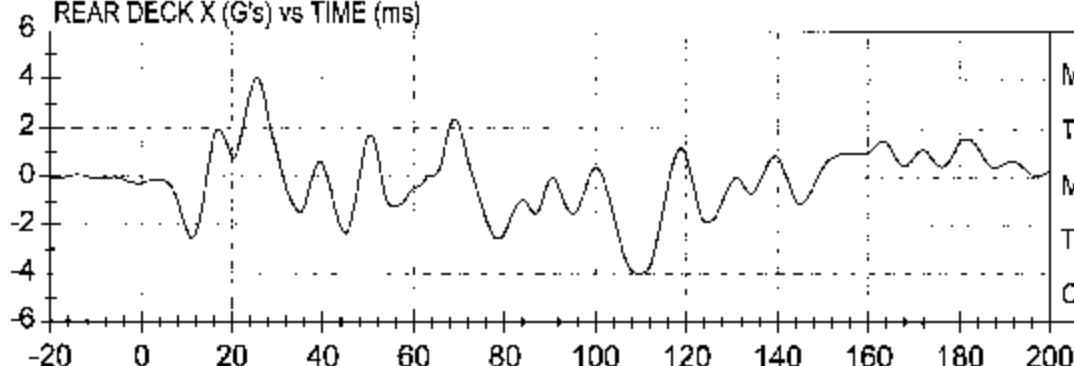
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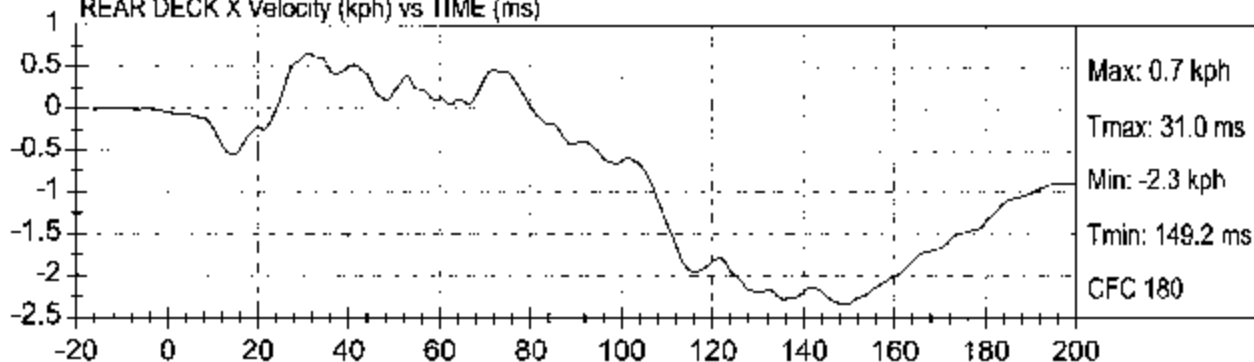
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2003 Volkswagen Passat C35802

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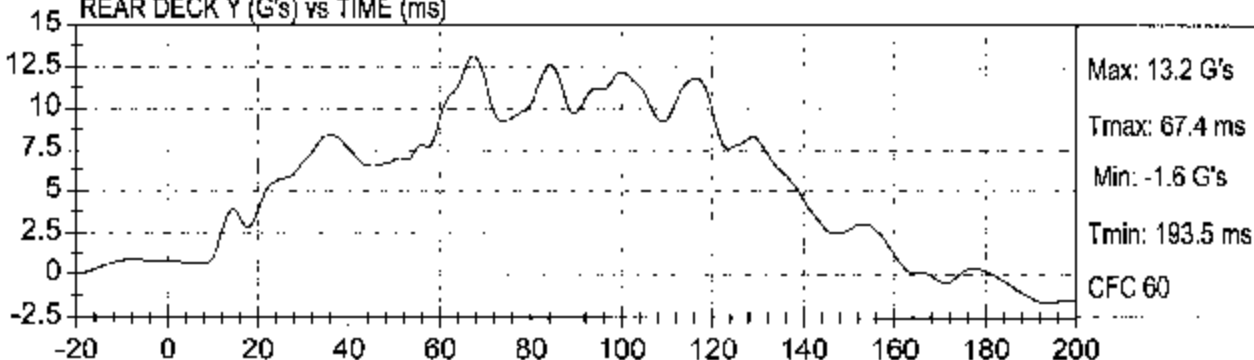
REAR DECK X (G's) vs TIME (ms)



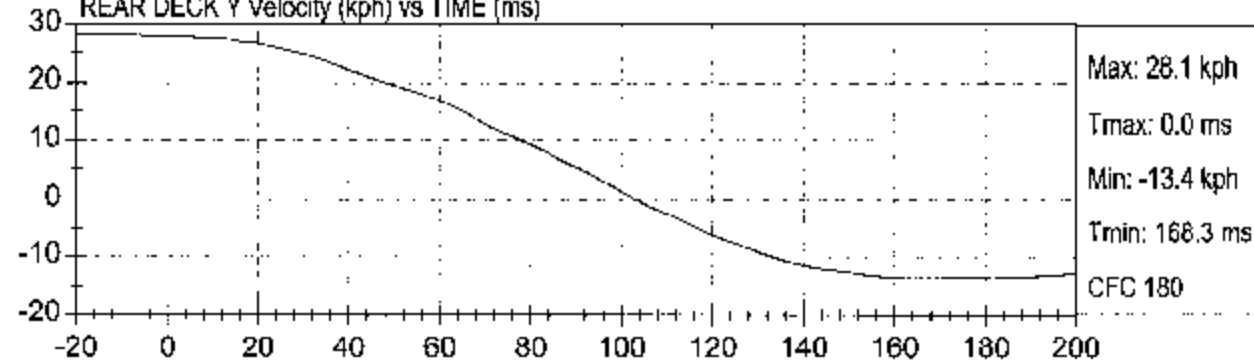
REAR DECK X Velocity (kph) vs TIME (ms)



REAR DECK Y (G's) vs TIME (ms)



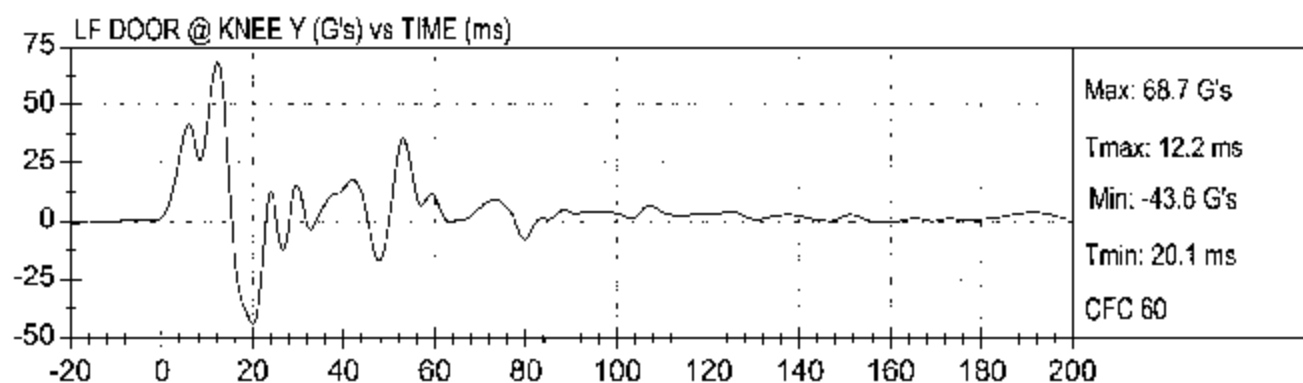
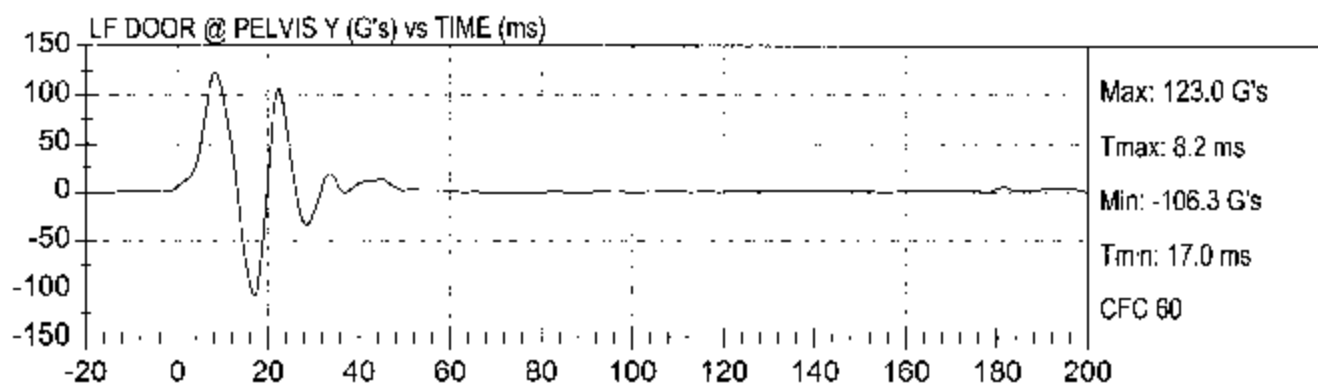
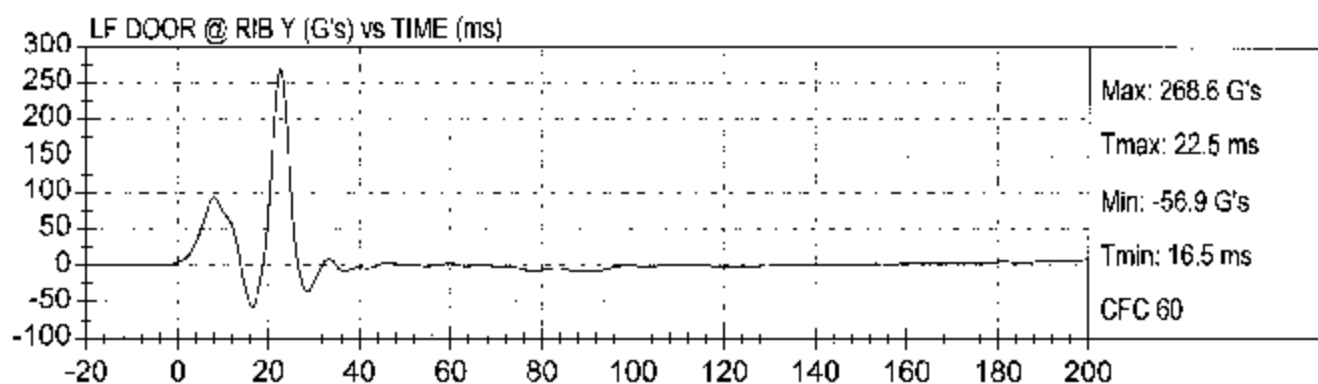
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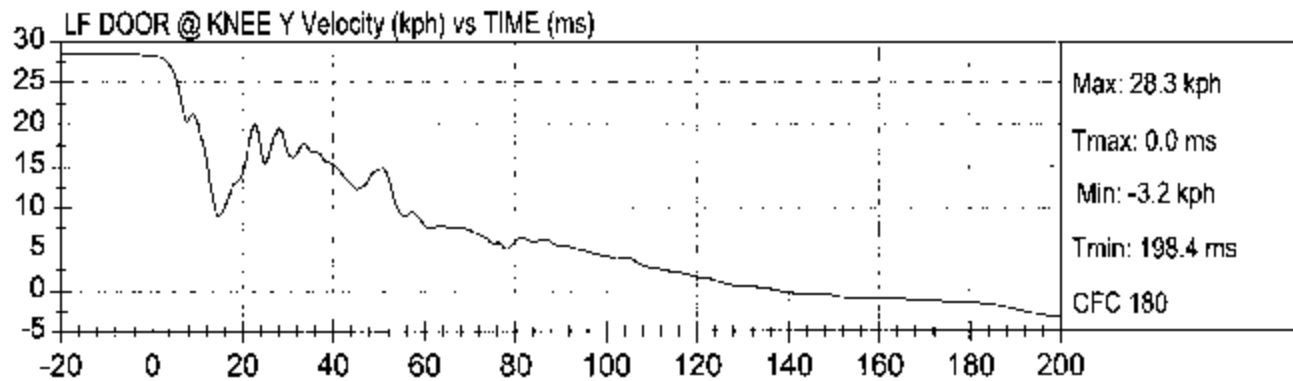
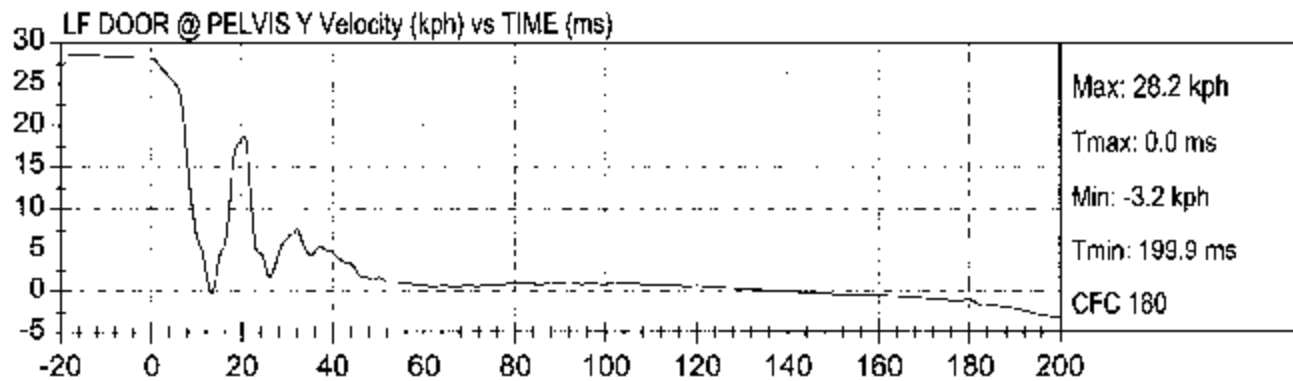
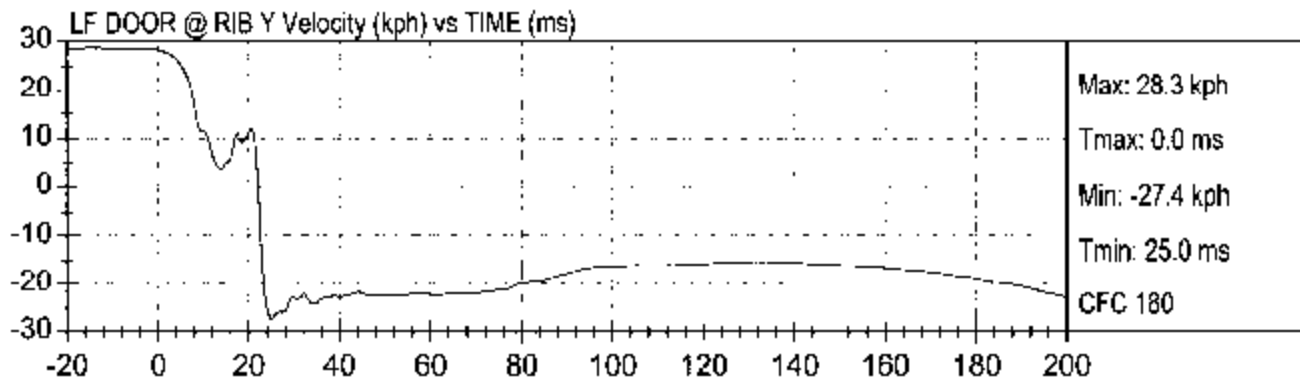




FMVSS 201P
2003 Volkswagen Passat C35802

Test Date: 3/26/2003
Speed: 17.7 mph (28.5 km/h)

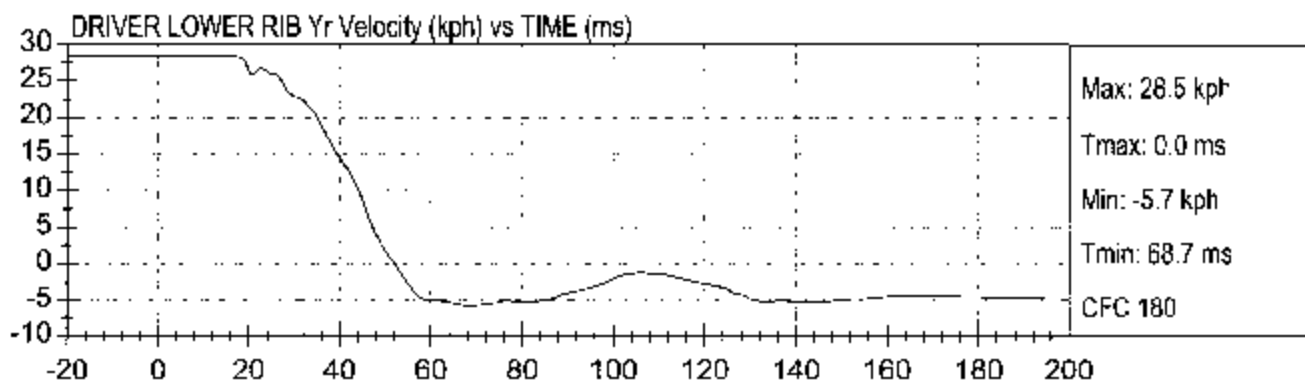
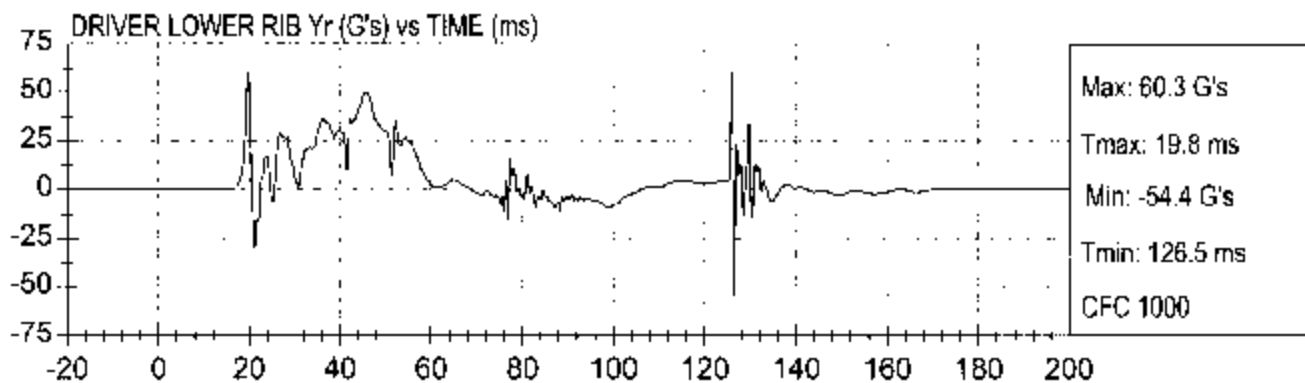
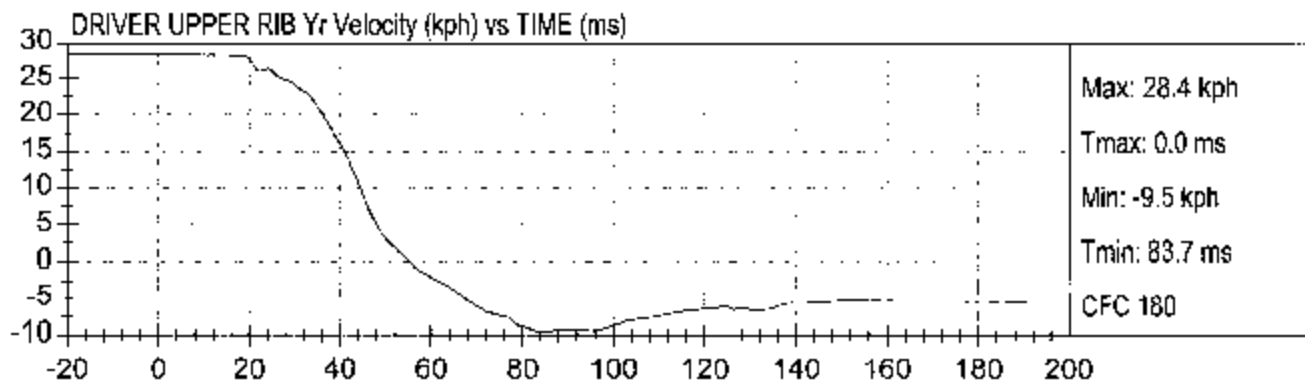
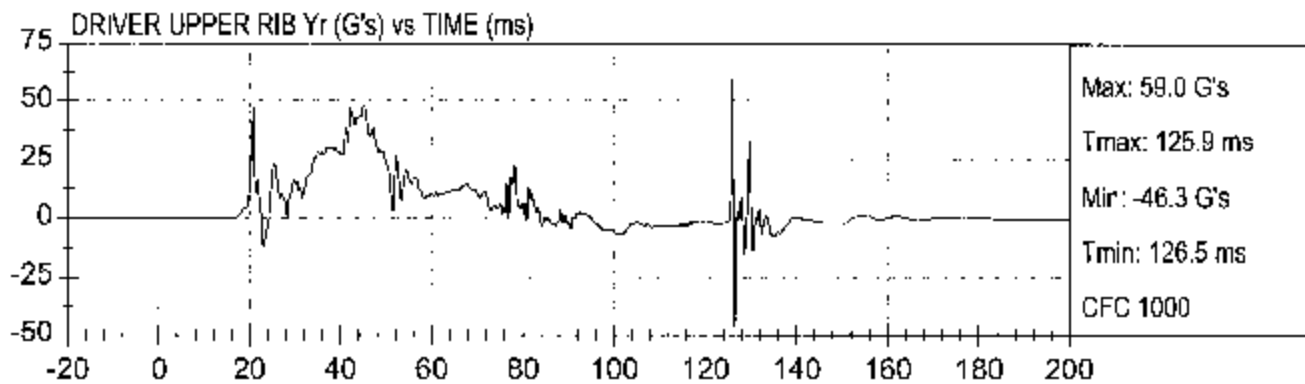






FMVSS 201P
2003 Volkswagen Passat C35802

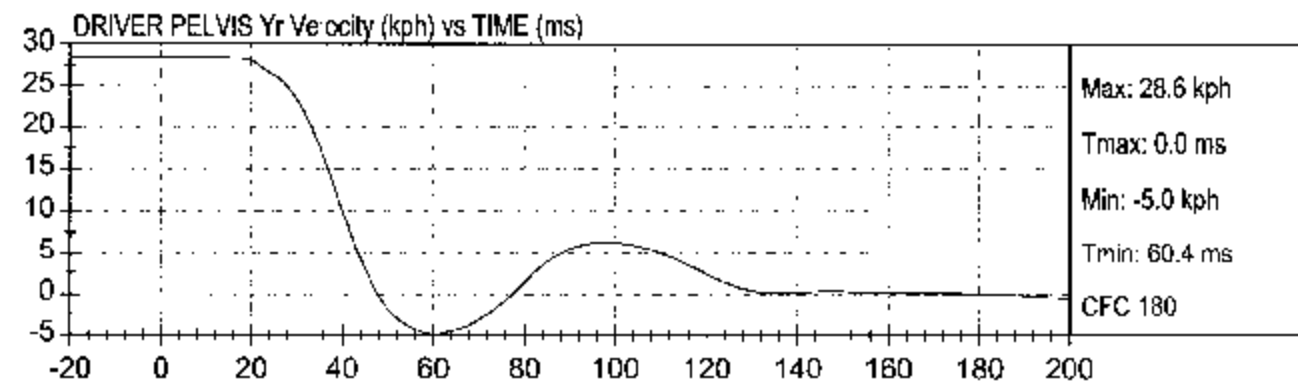
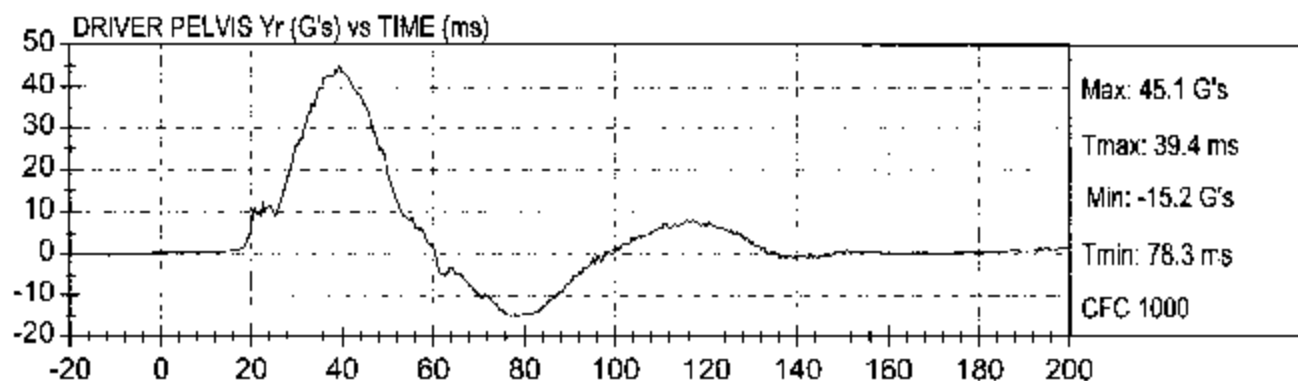
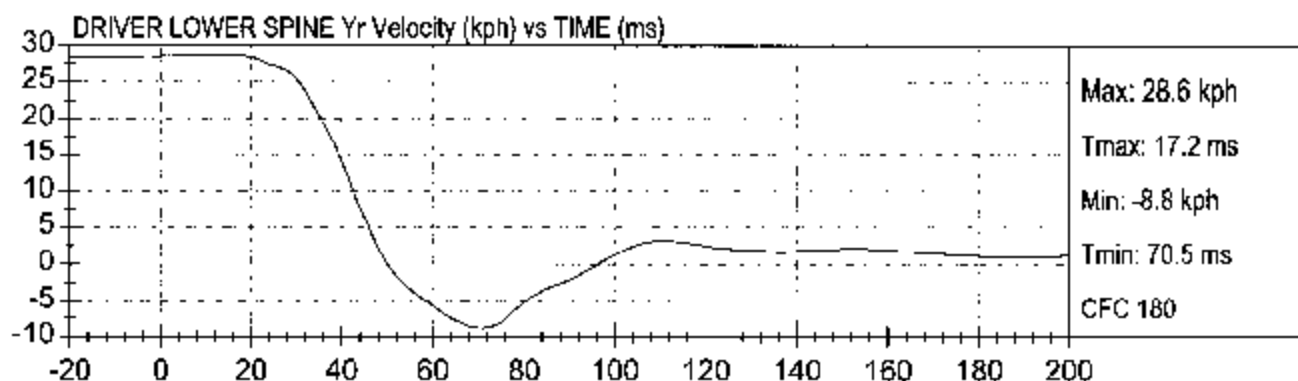
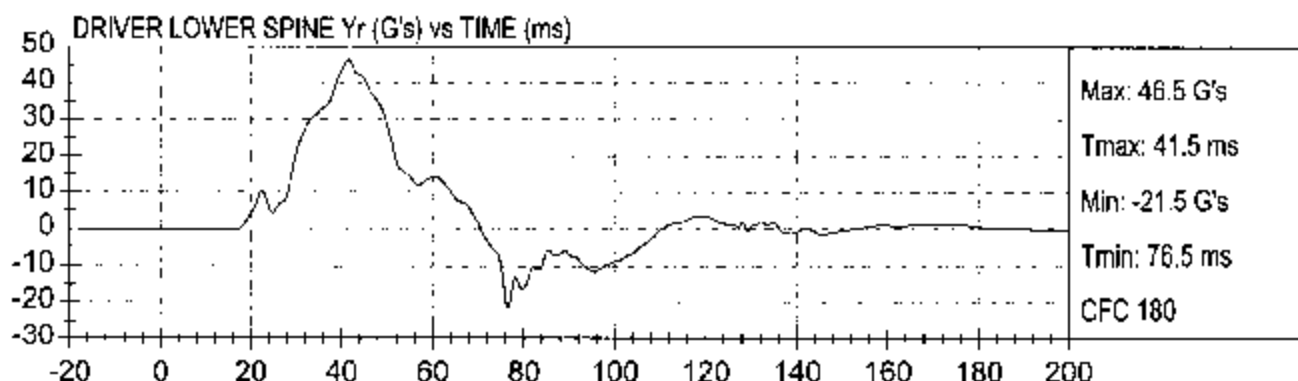
Test Date: 3/26/2003
Speed: 17.7 mph (28.5 km/h)





FMVSS 201P
2003 Volkswagen Passat C35802

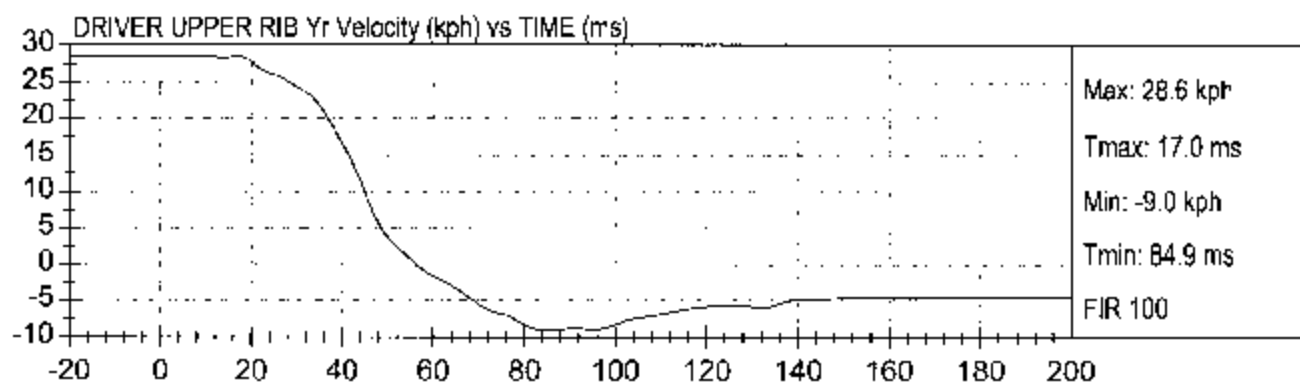
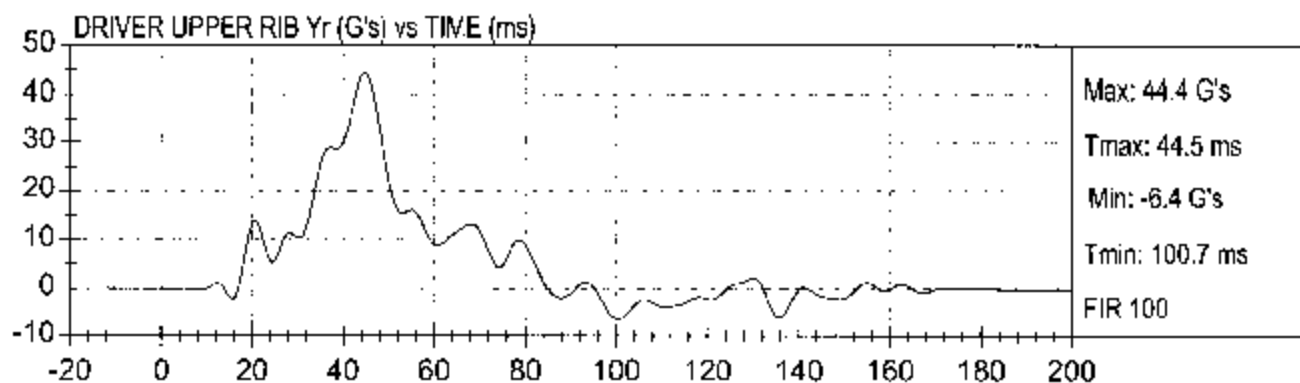
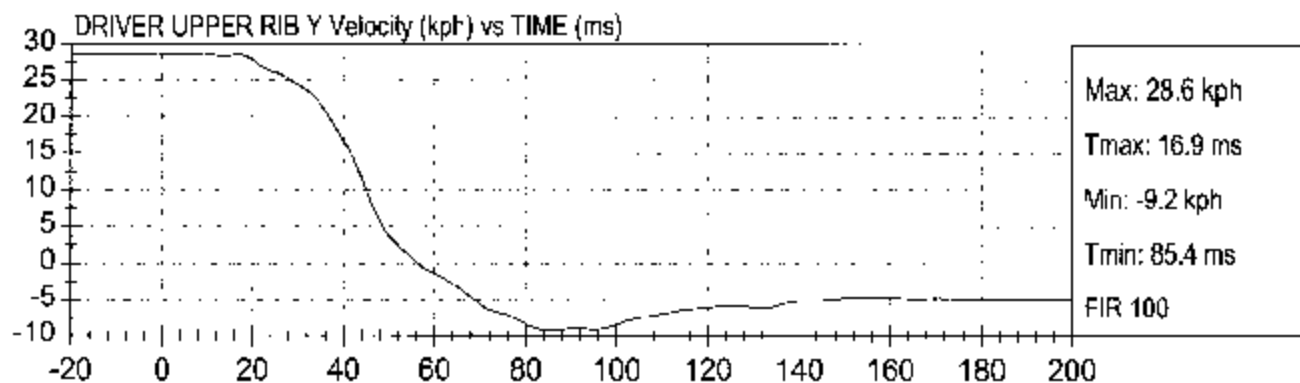
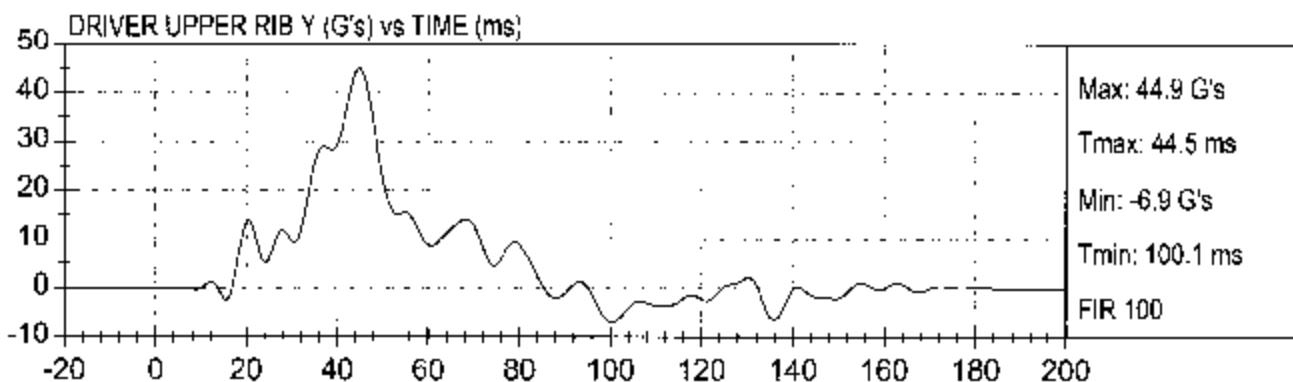
Test Date: 3/26/2003
Speed: 17.7 mph (28.5 km/h)





FMVSS 201P
2003 Volkswagen Passat C35802

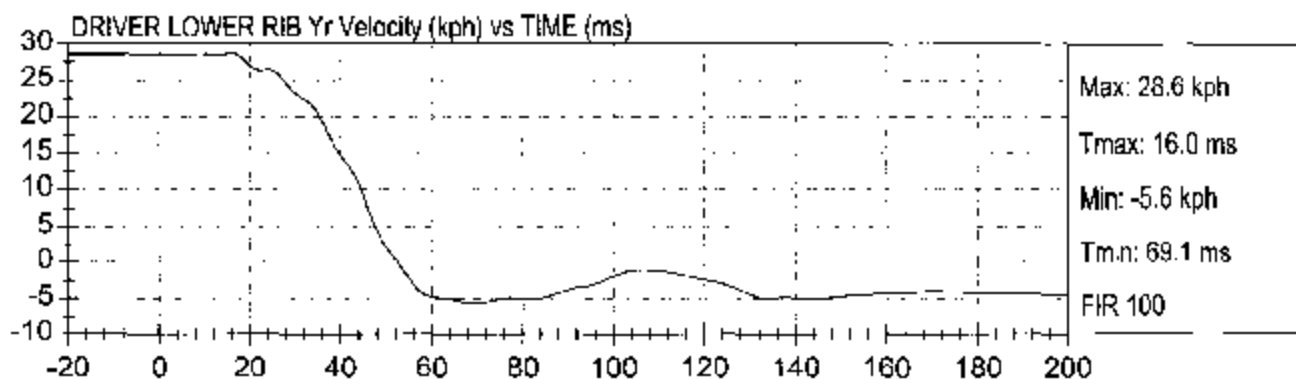
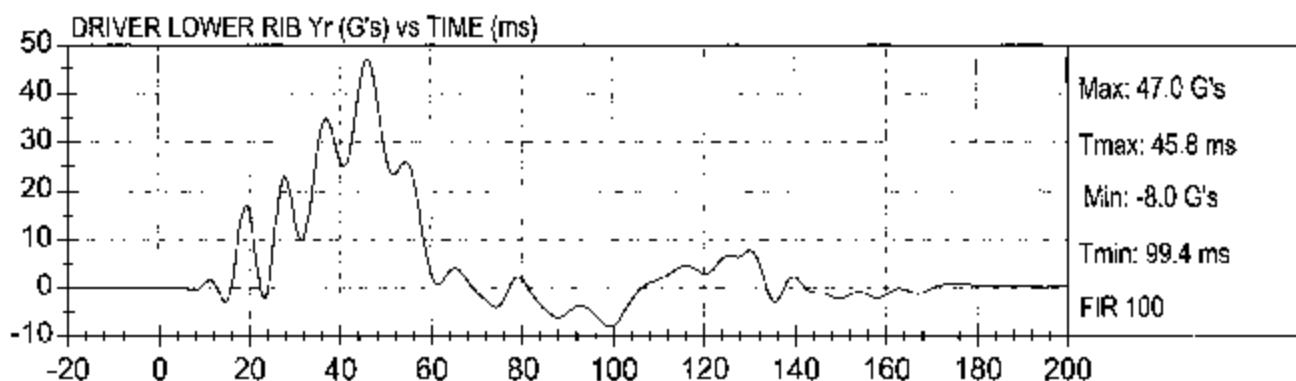
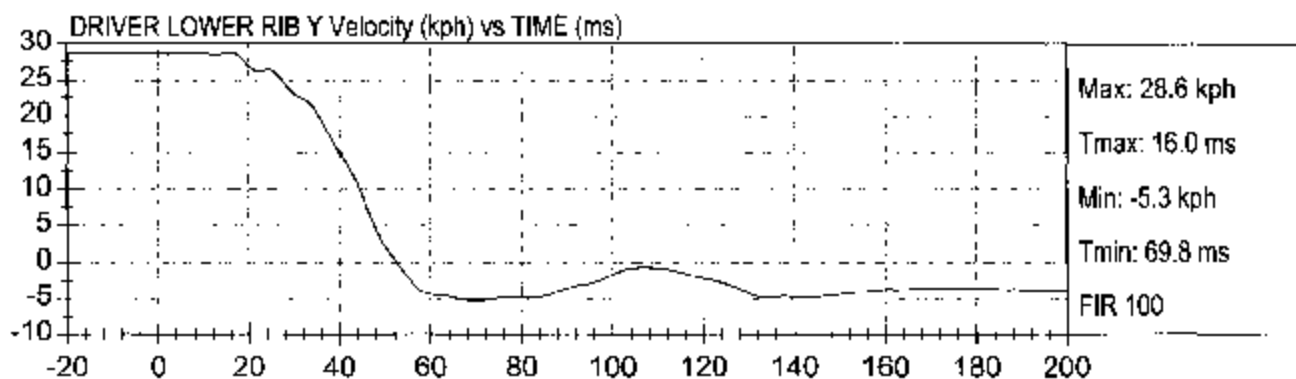
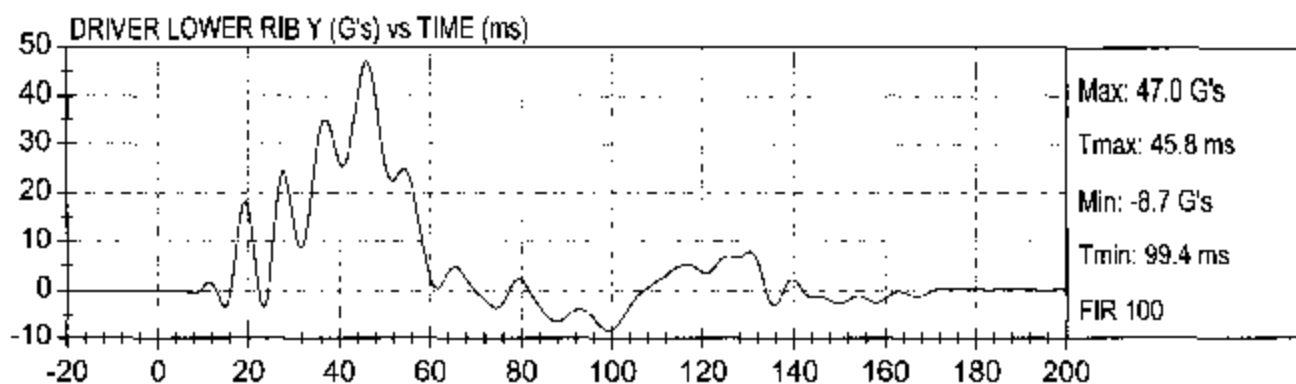
Test Date: 3/26/2003
Speed: 17.7 mph (28.5 km/h)

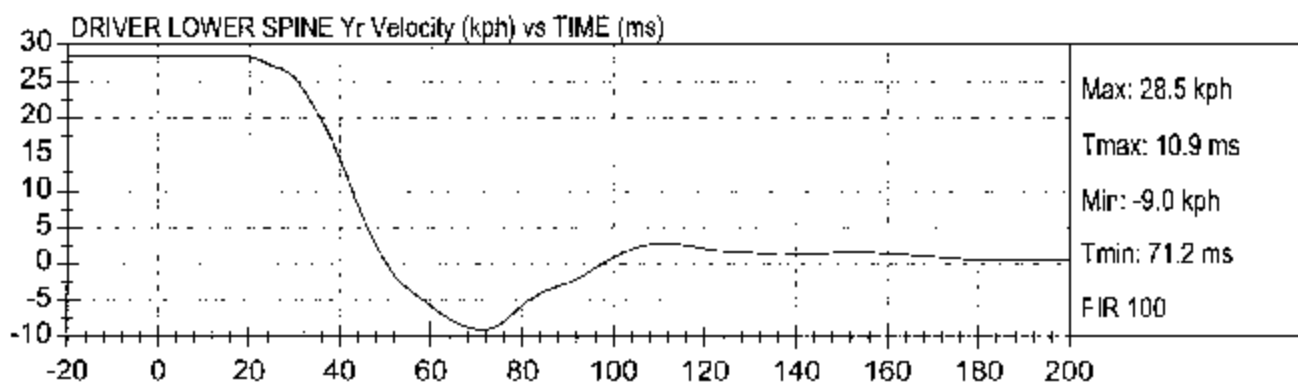
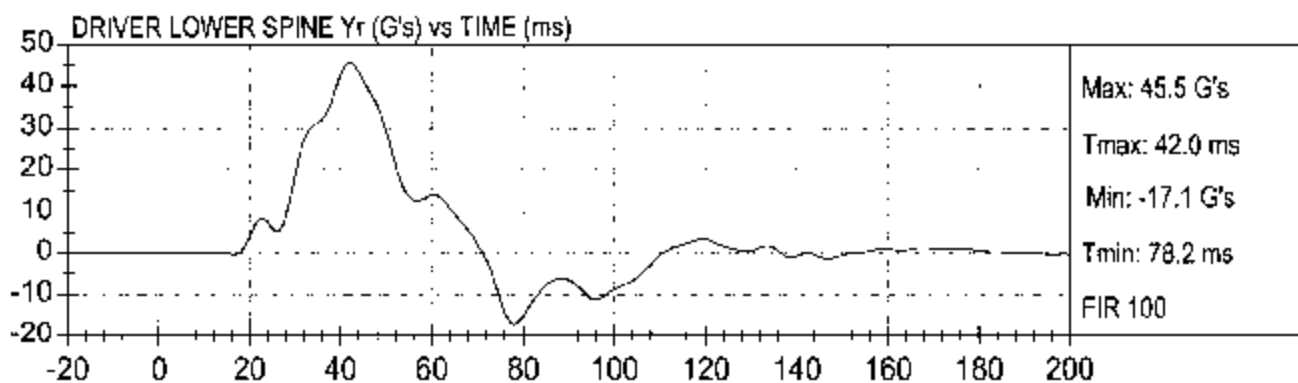
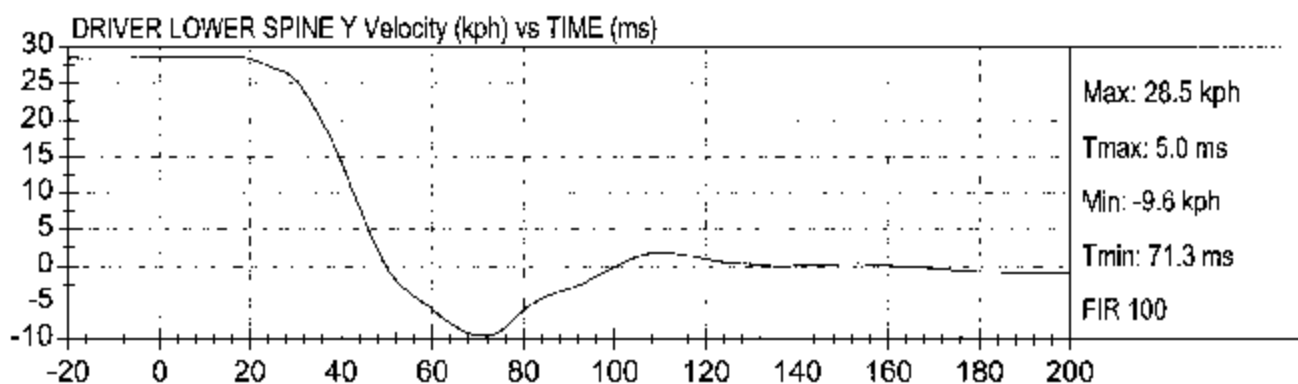
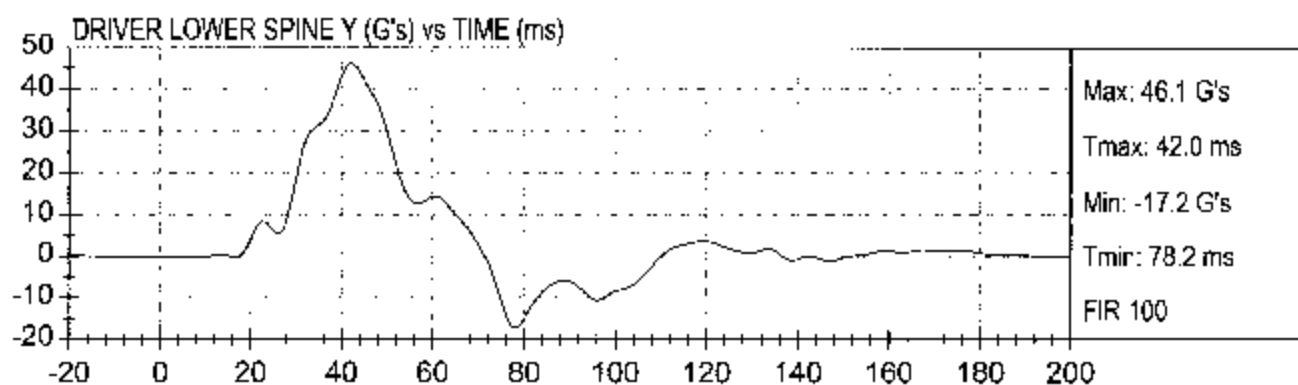




FMVSS 201P
2003 Volkswagen Passat C35802

Test Date: 3/26/2003
Speed: 17.7 mph (28.5 km/h)

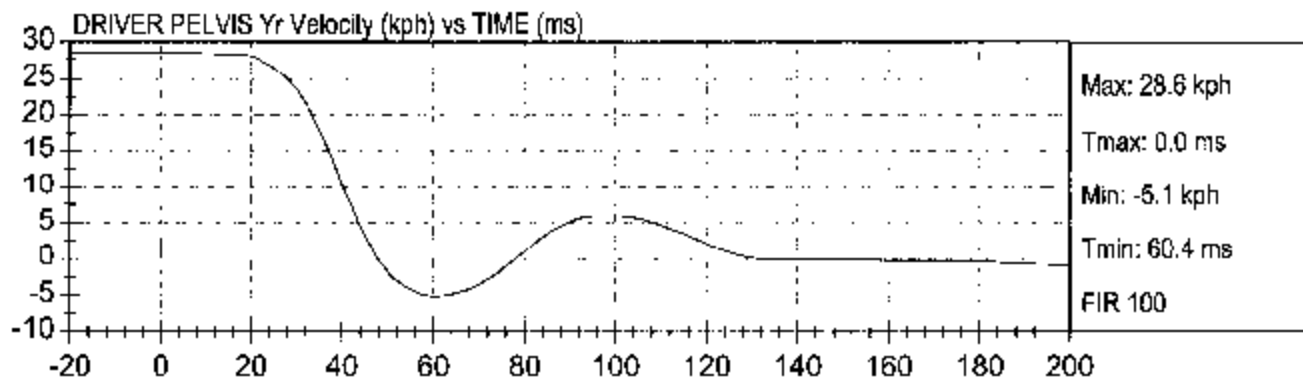
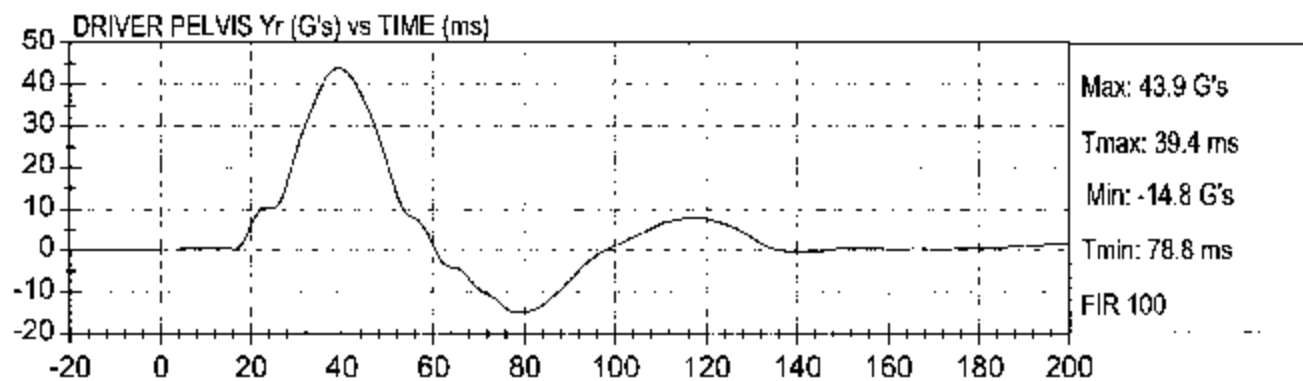
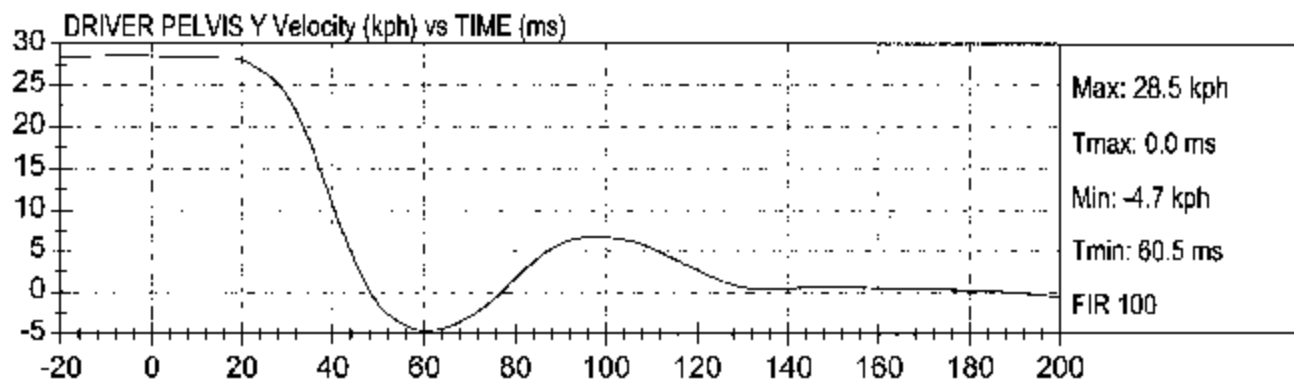
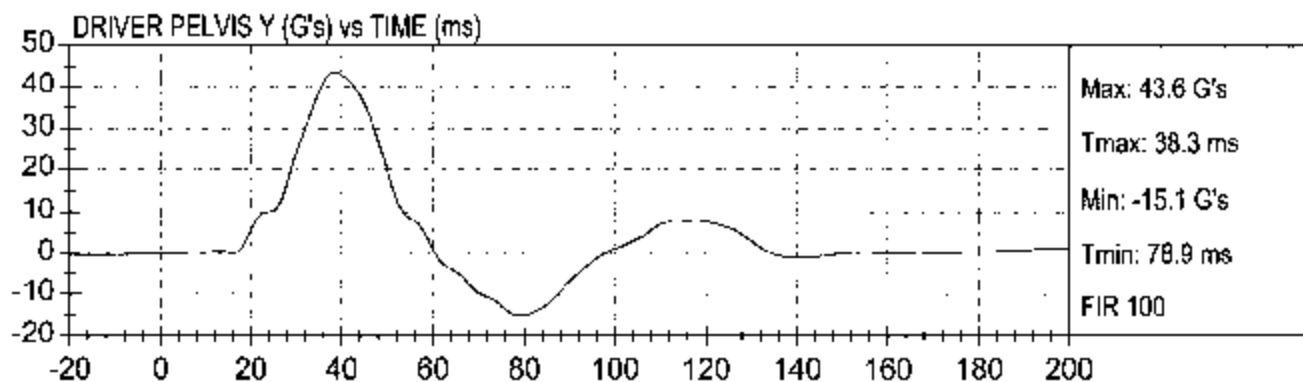






FMVSS 201P
2003 Volkswagen Passat C35802

Test Date: 3/26/2003
Speed: 17.7 mph (28.5 km/h)



APPENDIX C

SID/HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

SID/HIII CALIBRATION DATA SHEET
SIDE IMPACT DUMMY
CONFIGURED TO LEFT SIDE IMPACT

Technician: Tim Michnay

Test Parameter		Specification	Dummy Serial Number: 037	
			Pre-Test	Post-Test
SH-Seated Height (mm)		889 – 909	906	903
RH-Rib Height (mm)		501 – 521	510	513
HP-Hip Pivot Height (mm)		99 ref.	99	99
RD-Rib from Back Line (mm)		229 – 241	233	232
KV-Knee Pivot from Back Line (mm)		511 -526	522	519
SW-Knee Pivot to Floor (mm)		490 – 505	493	496
HW-Hip Width (mm)		356 - 391	378	383
Head Drop				
Temperature (°C)		18.9 – 25.5	21.6	21.4
Relative Humidity (%)		10 – 70	39	28
Peak Resultant Acceleration (G's)		120 – 150	143	134
Is Resultant Curve Unimodal		15% of Peak	Yes	Yes
Peak Longitudinal Acceleration (G's)		+/- 15	-7	-10
Neck Pendulum Test				
Temperature (°C)		20.6 – 22.2	20.7	21.3
Relative Humidity (%)		10 – 70	14	21
Impact Velocity (m/s)		6.89 – 7.13	6.97	7.00
Pendulum Deceleration	10 msec	1.96 – 2.55	2.22	2.28
	20 msec	4.12 – 5.10	4.41	4.45
	30 msec	5.73 – 7.01	6.31	6.28
	40 – 70 msec	6.27 – 7.64	6.84	7.00
Midsagittal Plane Max Rotation (deg)		66 – 82	72	72
Head Rotation Peak to Zero -- Decay Time (msec)		58 – 67	60	61
Max. Mx at Occipital Condyles (Nm)		73 – 88	78	78
Mx Peak to Zero – Decay Time (msec)		49 – 64	55	54
Mx Peak to Max. Head Rotation (msec)		2 – 16	14	10

SID/HIII CALIBRATION DATA SHEET (continued)

Test Parameter	Specification	Dummy Serial Number: 037	
		Pre-Test	Post-Test
Thorax Impact			
Temperature (°C)	18.9 – 25.5	20.2	21.4
Relative Humidity (%)	10 – 70	22	28
Probe Speed (m/s)	4.27 – 4.33	4.32	4.29
Upper Rib (g's)	37 – 46	39	44
Lower Rib (g's)	37 – 46	44	41
Lower Spine (g's)	15 – 22	22	21
Pelvis Impact			
Temperature (°C)	18.9 – 25.5	20.2	21.4
Relative Humidity (%)	10 – 70	22	28
Probe Speed (m/s)	4.27 – 4.33	4.30	4.30
Pelvis (g's)	40 - 60	45	47
Abdominal Compression			
Temperature (°C)	18.9 – 25.5	20.7	20.9
Relative Humidity (%)	10 – 70	14	29
Force @ 12.7 mm (N)	104 – 162	154	147
Force @ 19 mm (N)	163 – 222	211	200
Force @ 25.4 mm (N)	222 – 280	274	260
Force @ 33 mm (N)	325 – 391	370	348
Lumbar Flexion			
Temperature (°C)	18.9 – 25.5	20.3	21.1
Relative Humidity (%)	10 – 70	14	28
Force @ 0 deg (N)	0 – 26.7	0.0	0.0
Force @ 20 deg (N)	97.9 – 151.2	126.1	113.4
Force @ 30 deg (N)	151.2 – 204.6	191.3	152.0
Force @ 40 deg (N)	204.6 – 258.0	242.0	222.8
Return Angle (deg)	12 maximum	4	3

CERTIFICATION DATA

Dummy Serial Number: 037

CERTIFICATION DATA

Dummy Serial Number: 037

Pre-Test Calibration

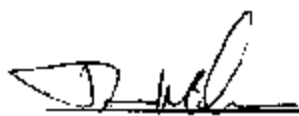
External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvis Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID/HIII Calibration Data Sheet
Side Impact Dummy
External Measurements

ATD Serial No: 037

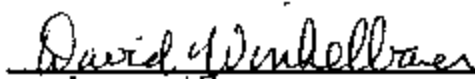
Test I.D.: D0347

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	906	Pass
RH - Rib Height	mm	501 - 521	510	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	233	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	522	Pass
SW - Knee Pivot to Floor	mm	490 - 505	493	Pass
HW - Hip Width	mm	356 - 391	378	Pass
Overall Test Results				Pass



Laboratory Technician

3/21/03
Test Date



Approved By

SID/HIII Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

ATD Serial No: 037

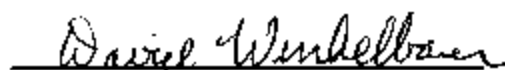
Test I.D: D03471

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Peak Resultant Acceleration	G's	120 to 150	143	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-7	Pass
Overall Test Results				Pass



Laboratory Technician

03/25/2003
Test Date



Approved By



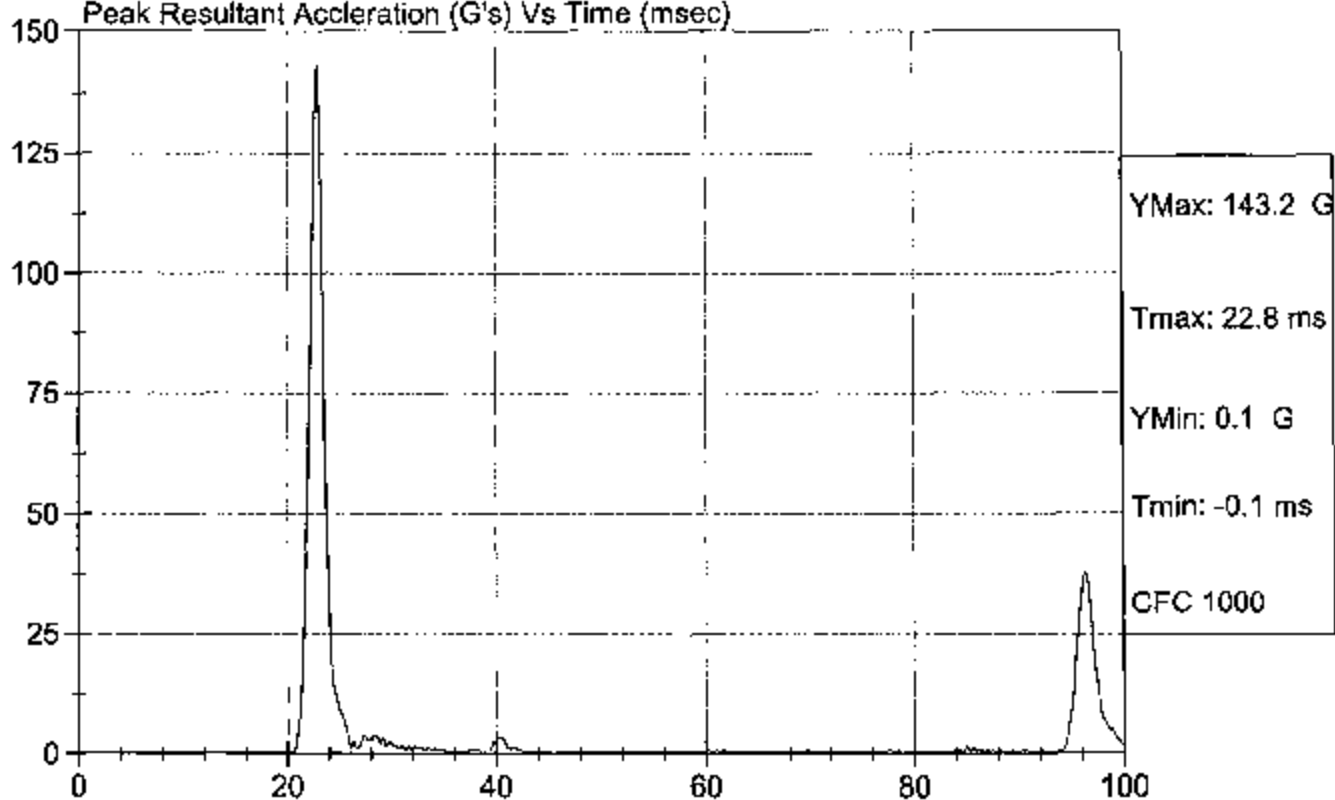
Test Description: Head Drop

Test Date: 03/25/2003

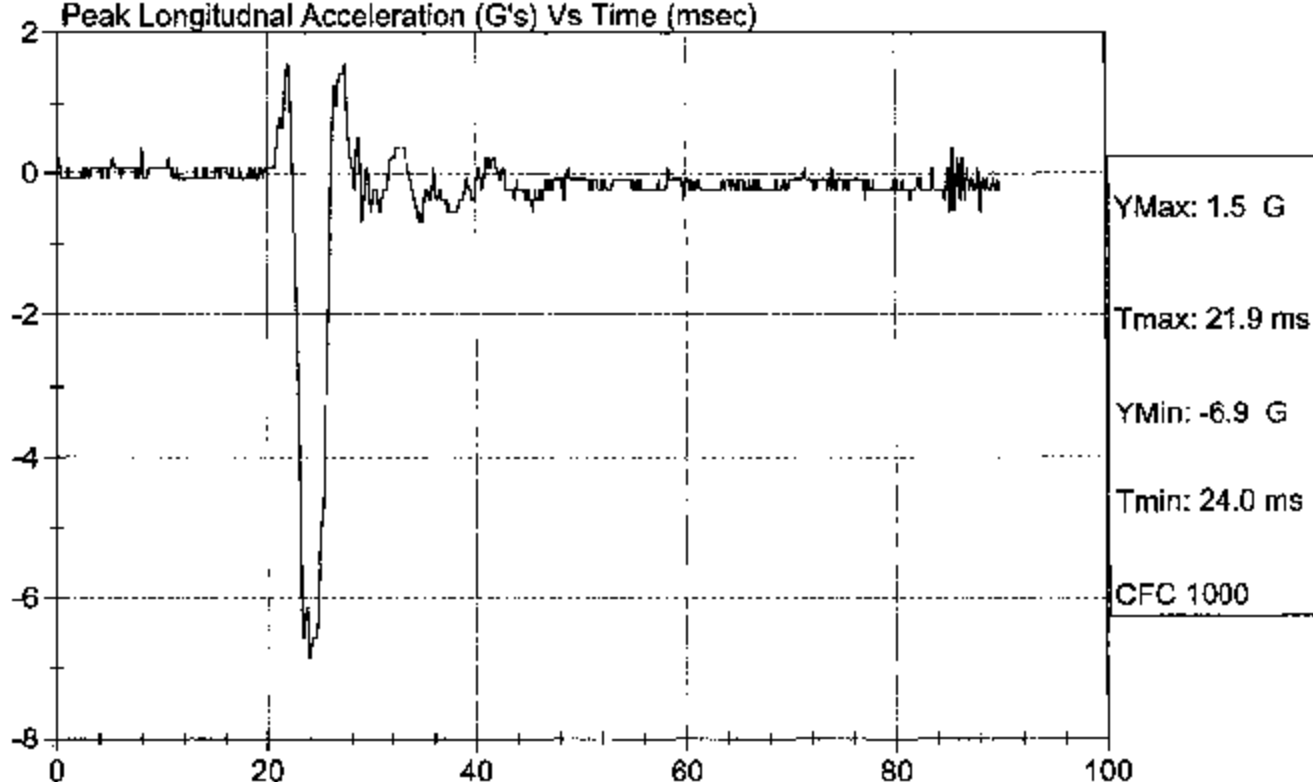
Component: D03471

Speed: 0 ft/s, 0.00 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



Peak Longitudinal Acceleration (G's) Vs Time (msec)

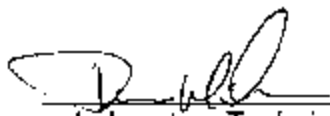


SID/HIII Calibration Data Sheet
Side Impact Dummy (SID)
Neck Pendulum Test

ATD Serial No: 037

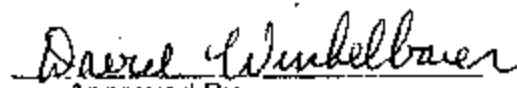
Test I.D: D03129

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.7	Pass
Laboratory Relative Humidity		%	10 to 70	14	Pass
Impact Velocity		m/s	6.89 to 7.13	6.97	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.22	Pass
	20 msec	m/s	4.12 to 5.10	4.41	Pass
	30 msec	m/s	5.73 to 7.01	6.31	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.84	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	72	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	60	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	78	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	55	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	14	Pass


 Laboratory Technician

02/04/2003

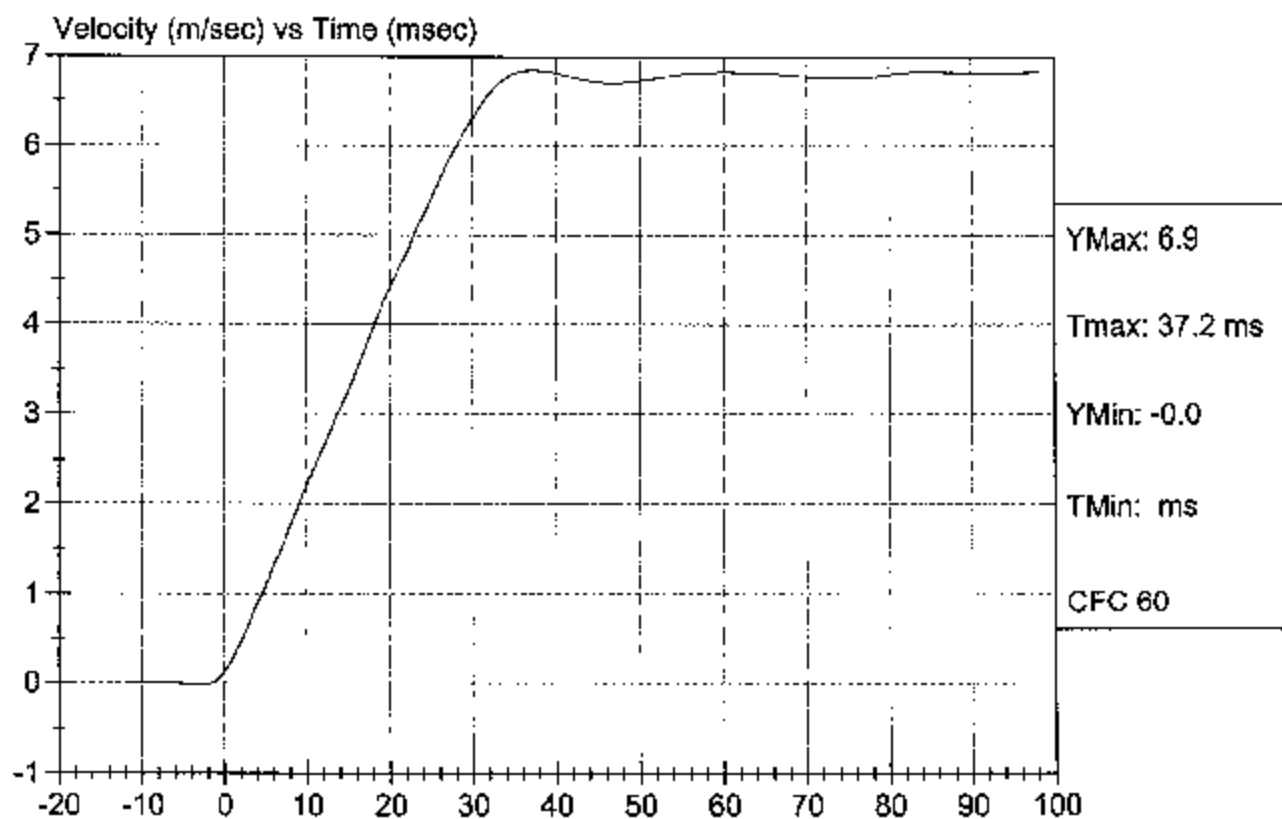
Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D03129

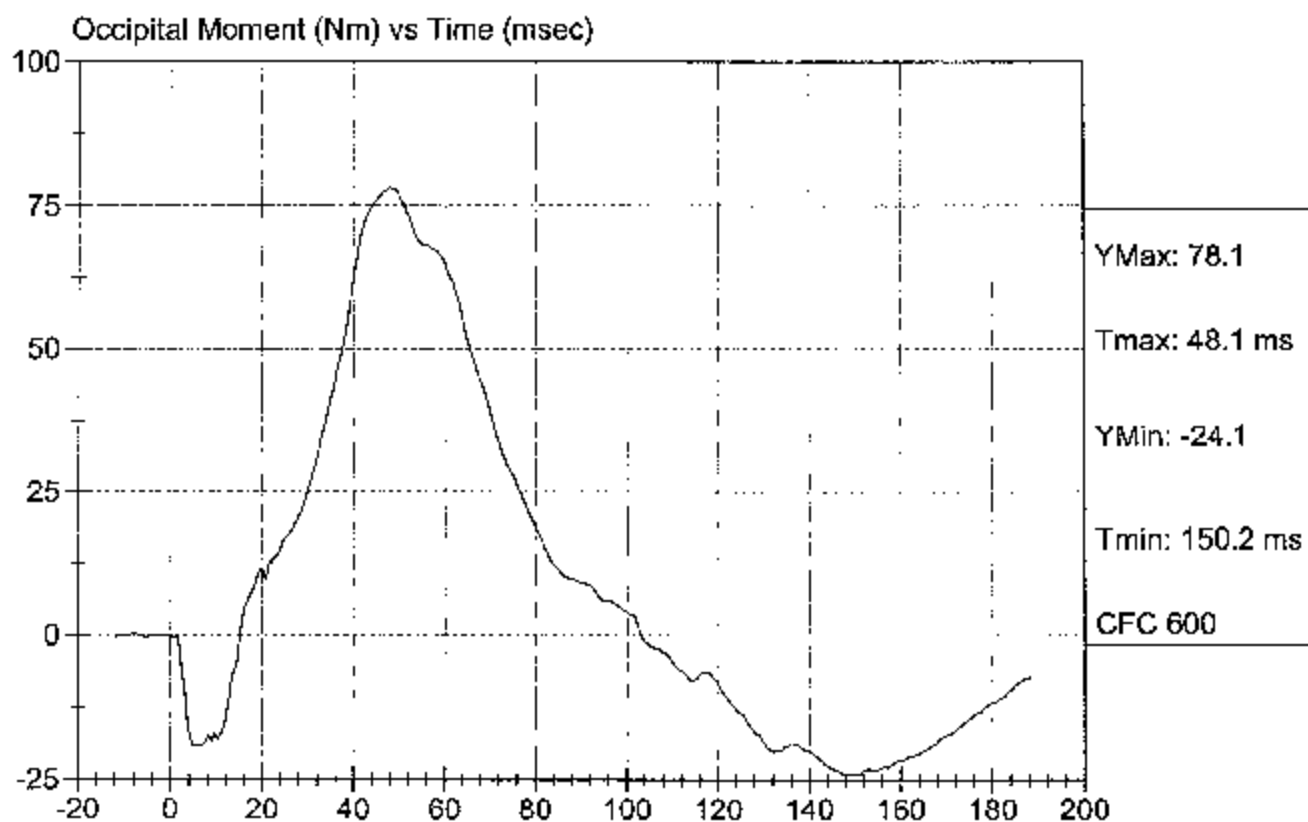
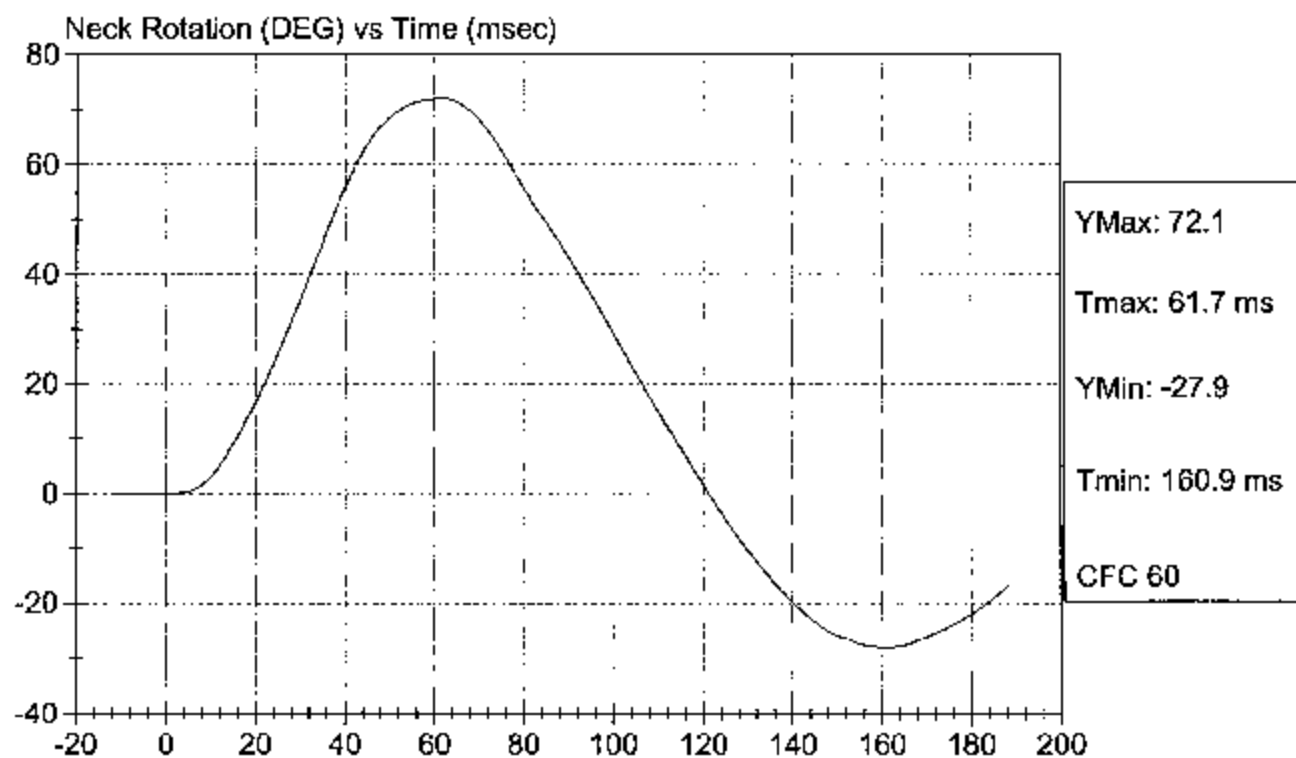
Test Date: 02/04/2003
Speed: 22.87 ft/sec, 6.97 m/sec





Test Desc: Neck Bending
Component ID: D03129

Test Date: 02/04/2003
Speed: 22.87 ft/sec, 6.97 m/sec



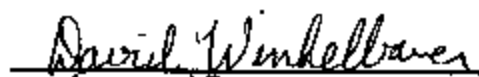
SID/HIII Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 037

Test I.D: D03122

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.2	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Velocity	m/s	4.27 - 4.33	4.32	Pass
Upper Rib	G's	37 - 46	39	Pass
Lower Rib	G's	37 - 46	44	Pass
Lower Spine	G's	15 - 22	22	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

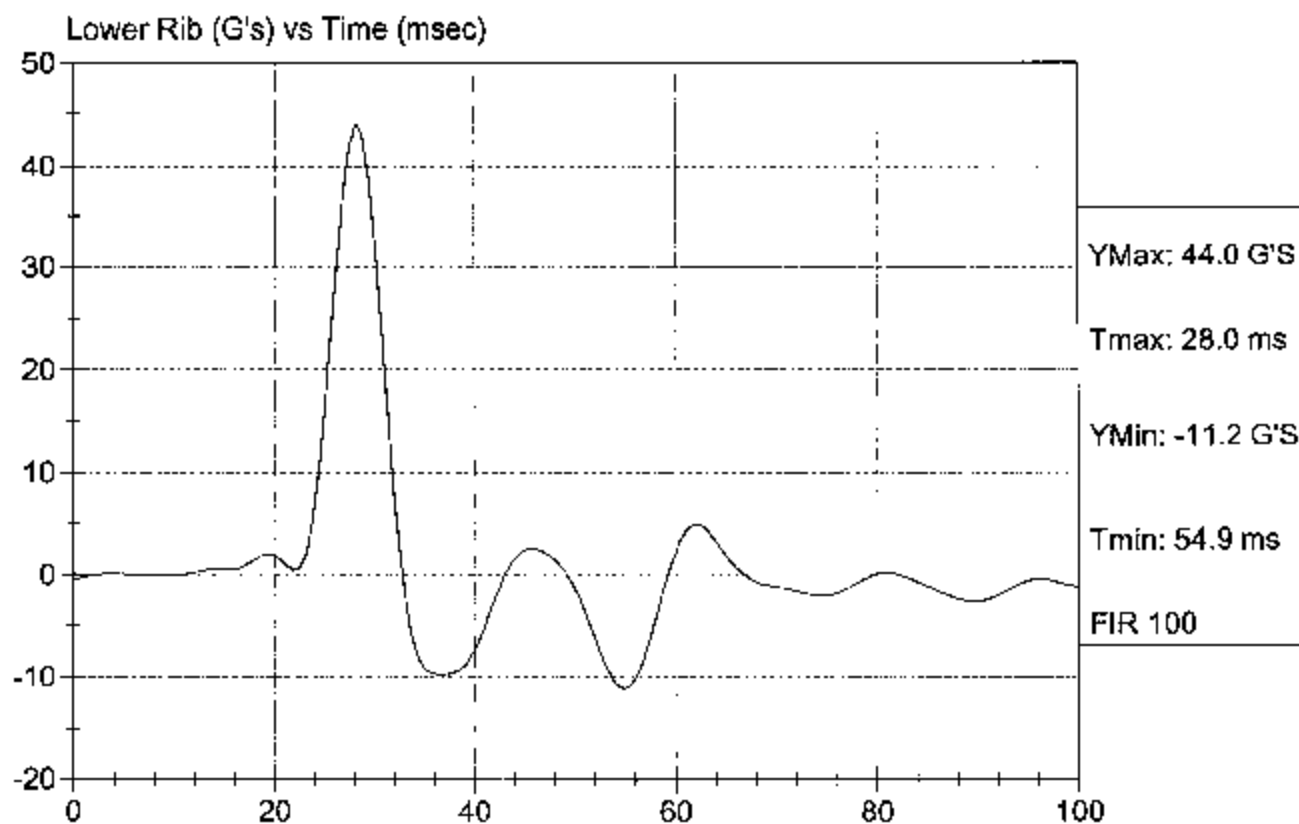
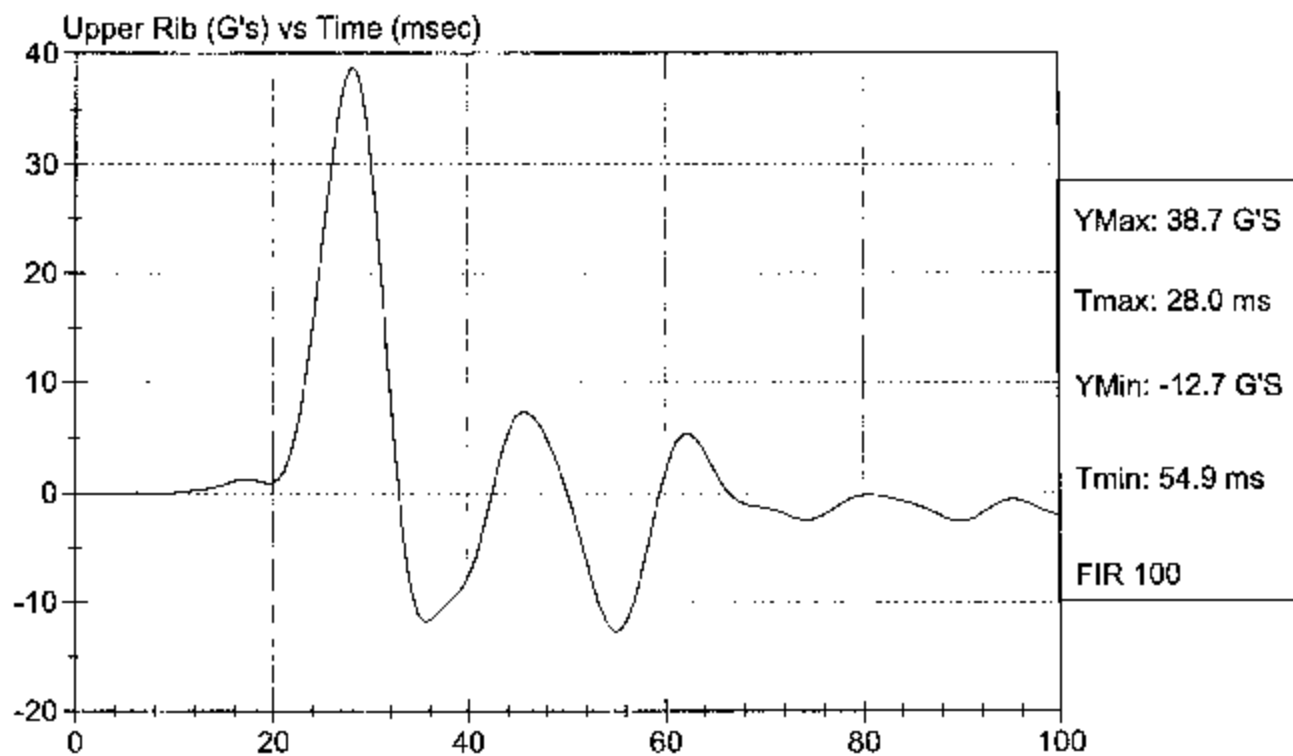
02/05/2003

Test Date



Test Desc: Thorax Impact
Component ID: D03122

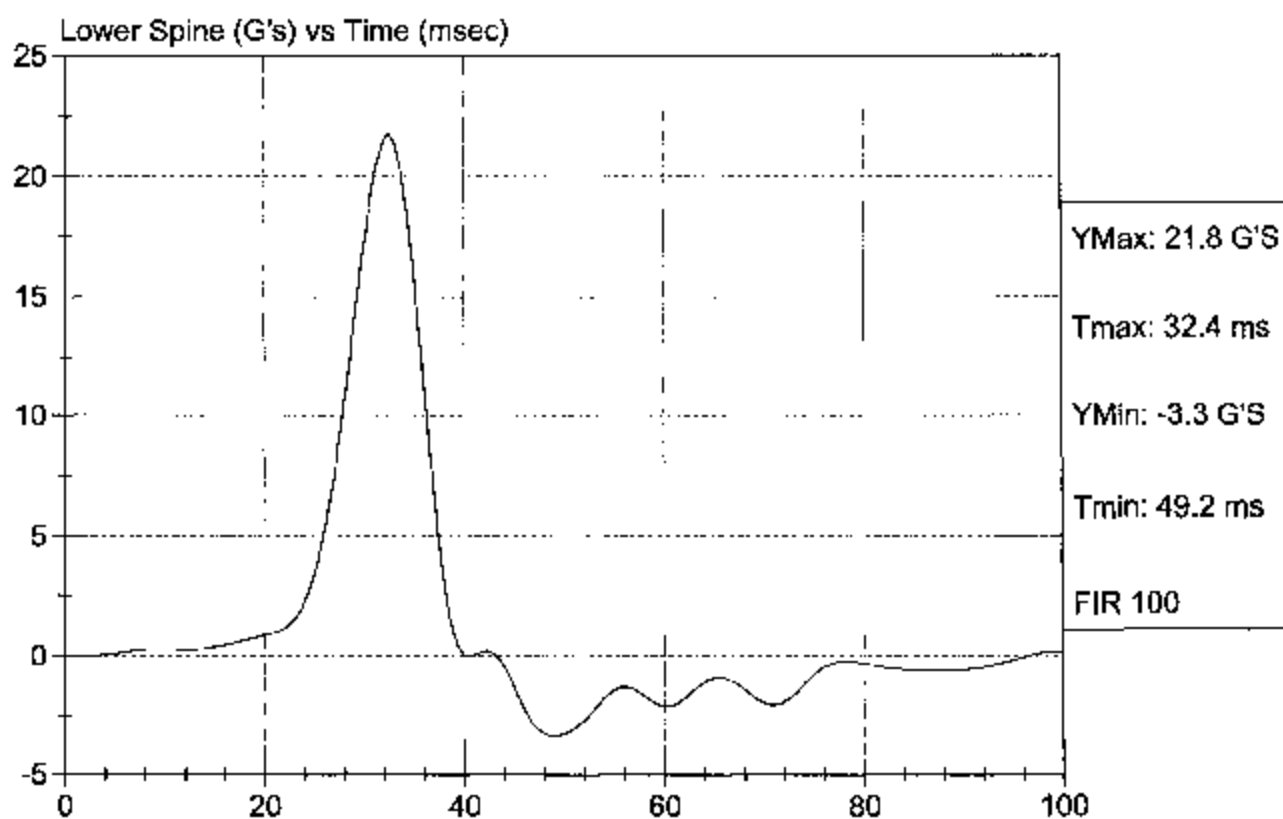
Test Date: 02/05/2003
Speed: 14.17 ft/sec, 4.32 m/sec





Test Desc: Thorax Impact
Component ID: D03122

Test Date: 02/05/2003
Speed: 14.17 ft/sec, m/sec

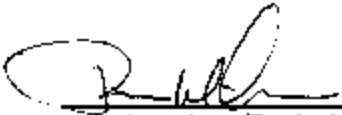


SID/HIII Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

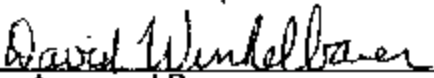
ATD Serial No: 037

Test I.D: D03123

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.2	Pass
Laboratory Relative Humidity	%	10 to 70	22	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	45	Pass
Overall Test Results				Pass



Laboratory Technician



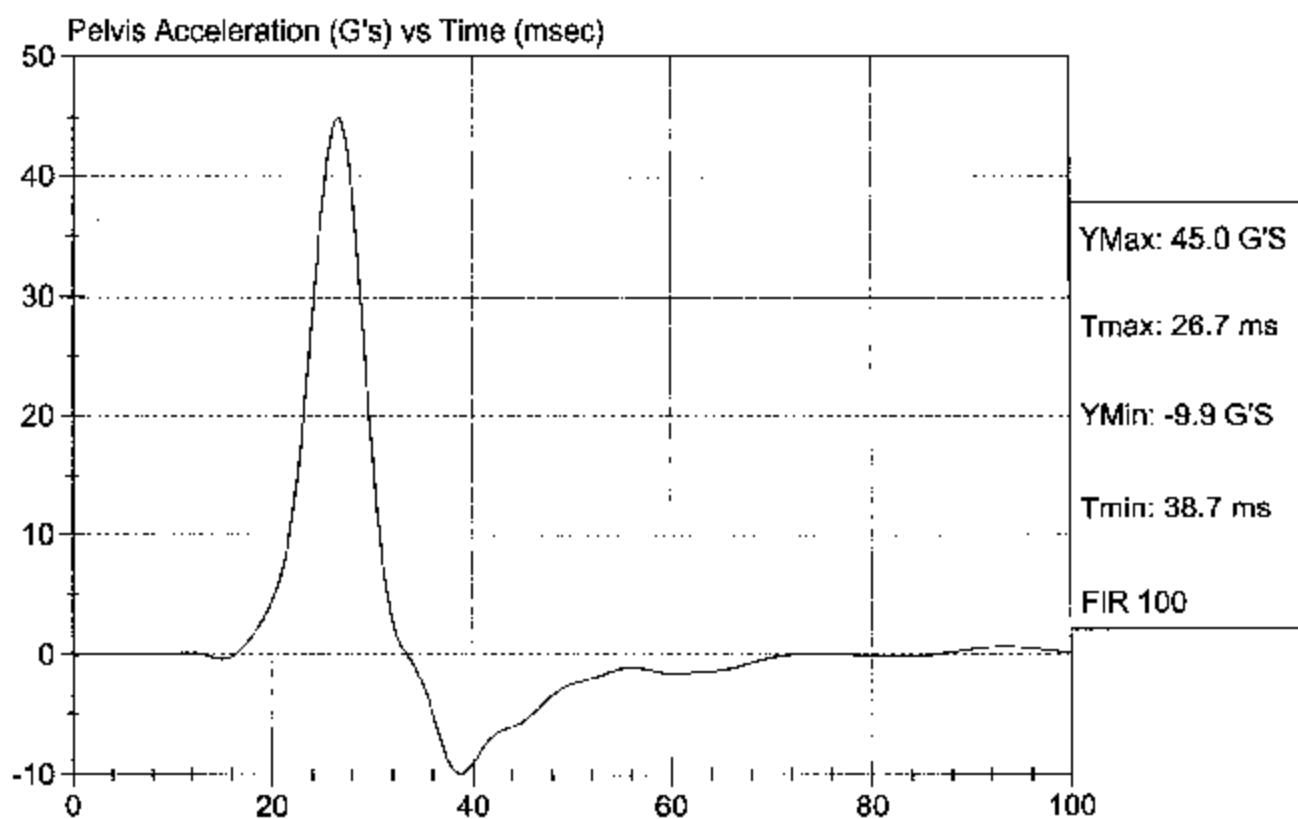
Approved By

02/06/2003
Test Date



Test Desc: Pelvis Impact
Component ID: D03123

Test Date: 02/06/2003
Speed: 14.12 ft/sec, 4.30 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 037

Test I.D: D03124

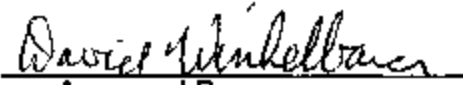
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	14	Pass
Force At 12.7 mm	N	104 - 162	154	Pass
Force At 19 mm	N	163 - 222	211	Pass
Force At 25.4 mm	N	222 - 280	274	Pass
Force At 33 mm	N	325 - 391	370	Pass
Overall Test Results				Pass



Laboratory Technician

02/05/2003

Test Date



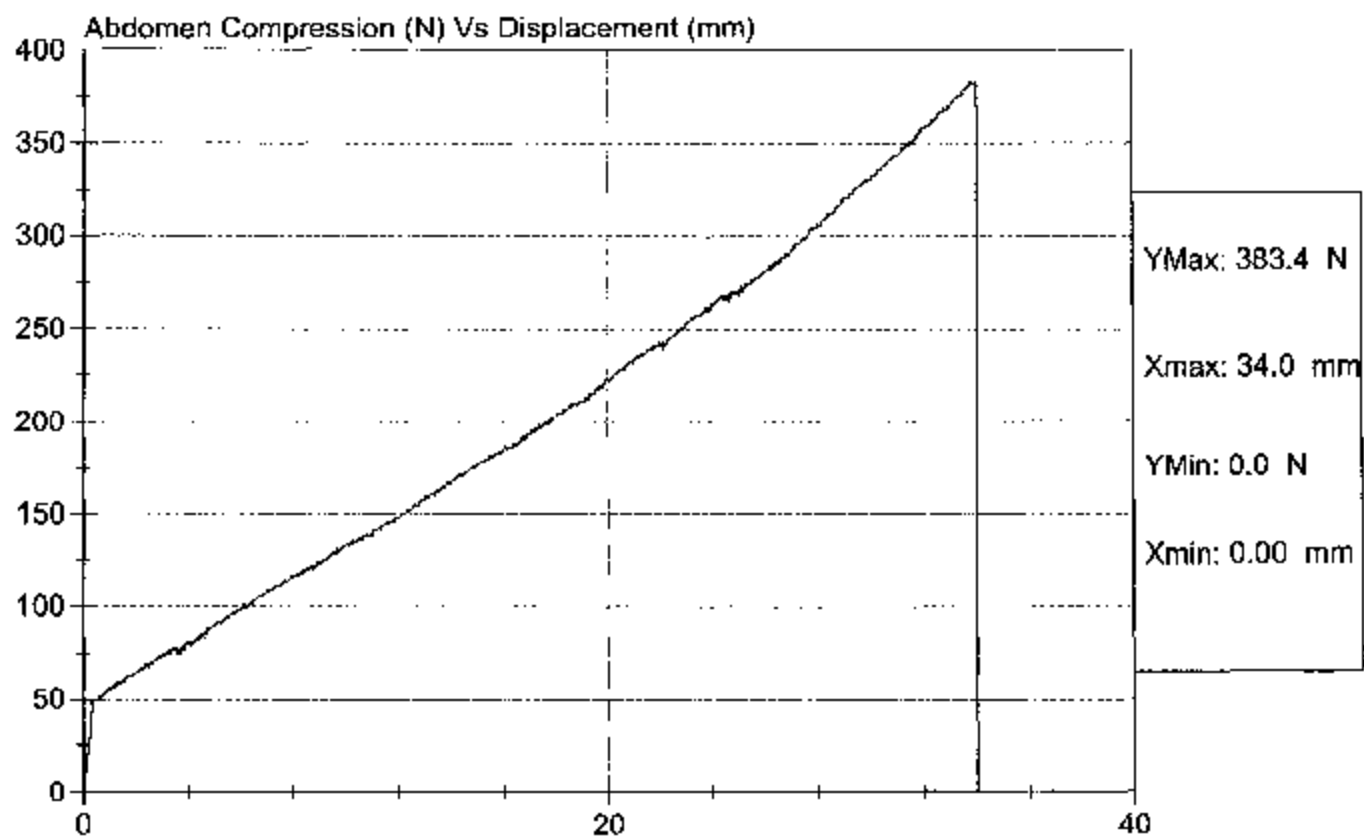
Approved By



Test Description: Abdomen Compression Test Date: 02/05/2003

Component: D03124

Speed: 0 ft/sec, 0 m/sec

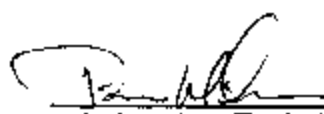


SID/HIII Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

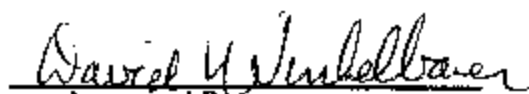
ATD Serial No: 037

Test I.D: D03125

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.3	Pass
Laboratory Relative Humidity	%	10 to 70	14	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	126.1	Pass
Force At 30 deg	N	151.2 - 204.6	191.3	Pass
Force At 40 deg	N	204.6 - 258.0	242.0	Pass
Return Angle	Deg	12 Maximum	4	Pass
Overall Test Results				Pass


 Laboratory Technician

02/05/2003
 Test Date


 Approved By

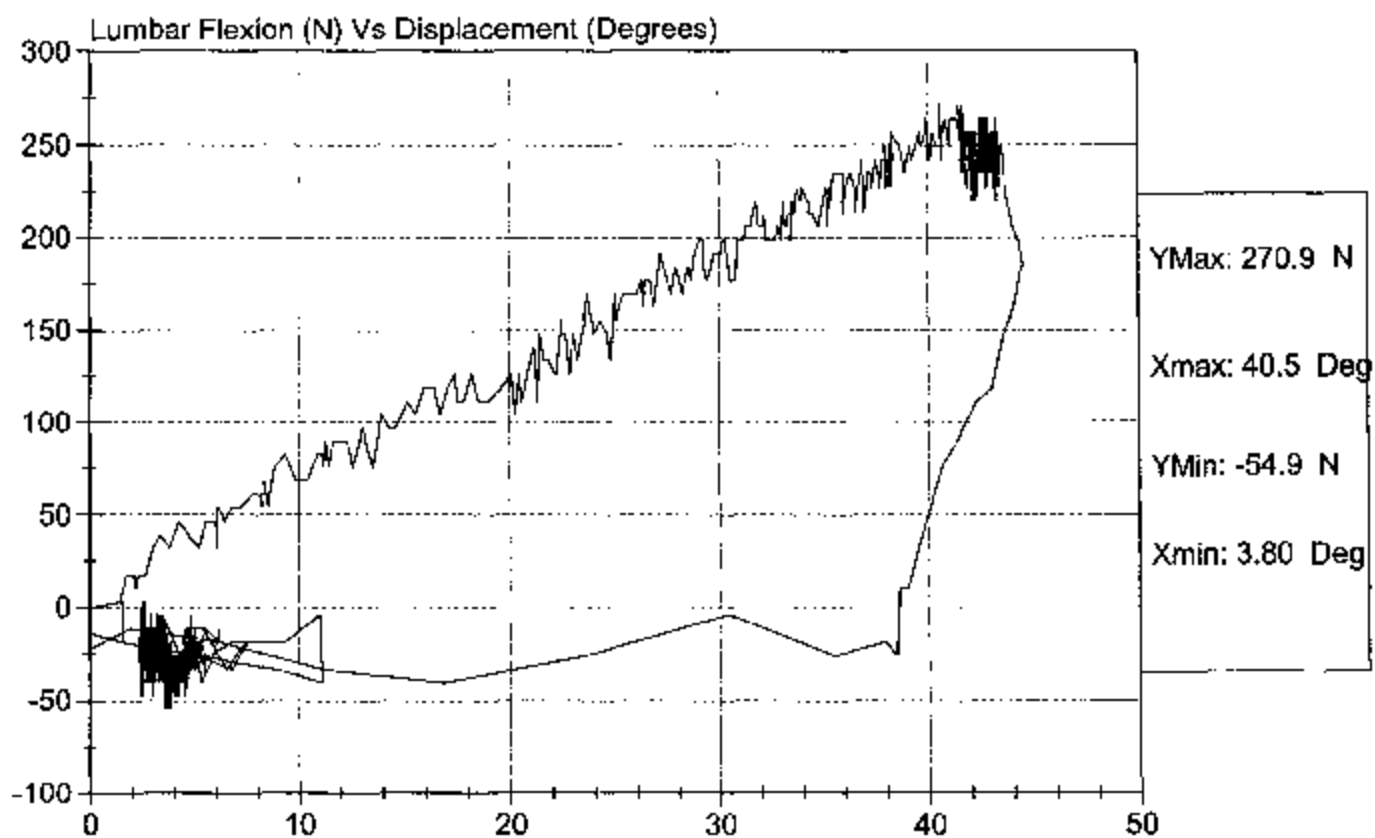


Test Description: Lumbar Flexion

Test Date: 02/05/2003

Component: D03125

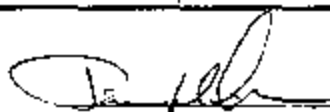
Speed: 0 ft/sec, 0 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 037

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, accelerometer mount	Pass
Rib Cage	Visual, measure	Pass
Stemum	Visual	Pass
Lumbar Spine	Visual	Pass
Abdomen	Visual	Pass
Pelvis	Visual, palpate, accelerometer mount	Pass
Upper Legs	Visual	Pass
Knees	Visual	Pass
Lower Legs	Visual, range of motion	Pass
Ankles	Visual, range of motion	Pass
Feet	Visual, range of motion	Pass
Joints	1 to 2 g range	Pass
Other		Pass


 Laboratory Technician
David Winkelman
 Approved By

03/25/2003
 Test Date

CERTIFICATION DATA

Dummy Serial Number: 037

CERTIFICATION DATA

Dummy Serial Number: 037

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvis Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID/HIII Calibration Data Sheet
Side Impact Dummy
External Measurements

ATD Serial No: 036

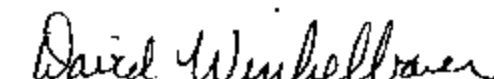
Test I.D.: D0354

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	903	Pass
RH - Rib Height	mm	501 - 521	513	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	232	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	519	Pass
SW - Knee Pivot to Floor	mm	490 - 505	496	Pass
HW - Hip Width	mm	356 - 391	383	Pass
Overall Test Results				Pass


Laboratory Technician

3/28/03

Test Date


Approved By

SID/HIII Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

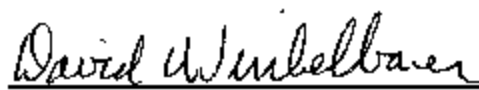
ATD Serial No: 037

Test I.D: D03551

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Peak Resultant Acceleration	G's	120 to 150	134	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-10	Pass
Overall Test Results				Pass



Laboratory Technician



Approved By

03/27/2003

Test Date



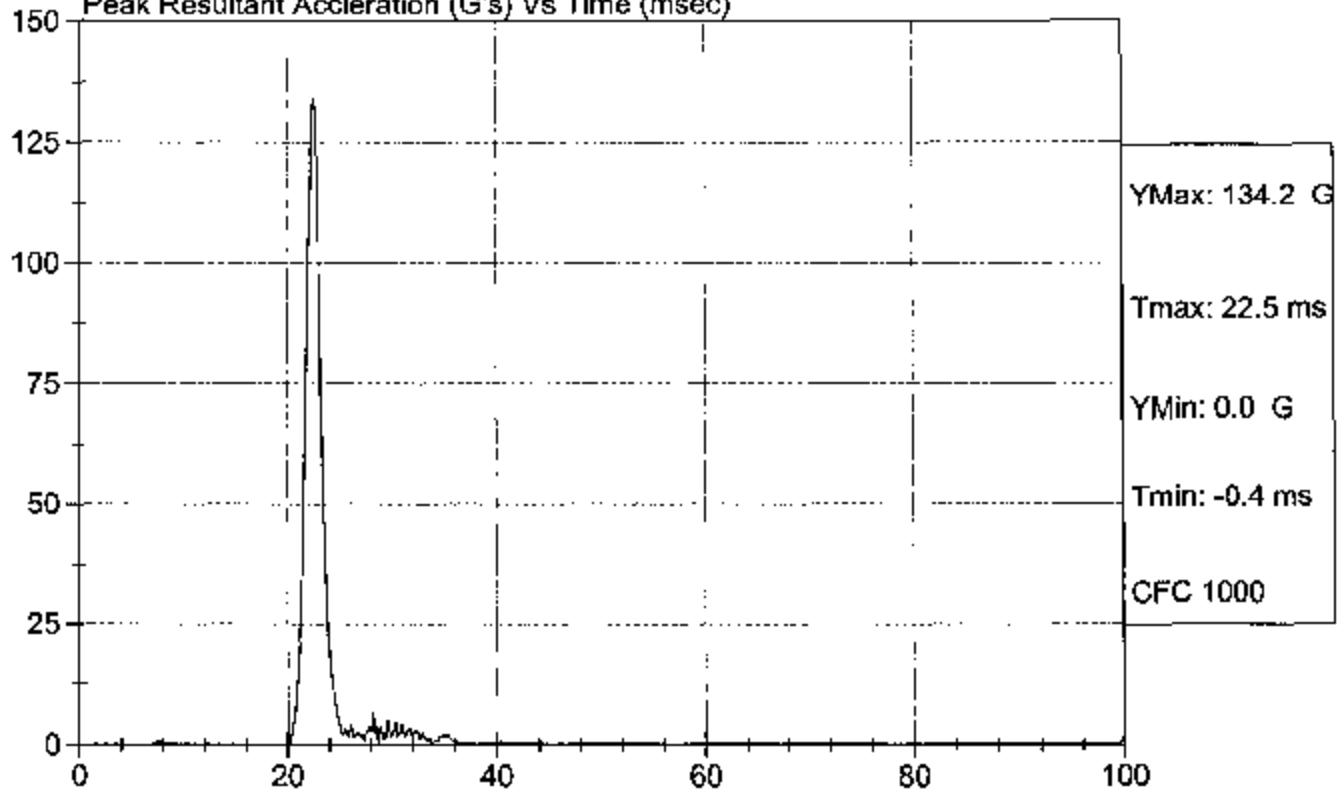
Test Description: Head Drop

Test Date: 03/27/2003

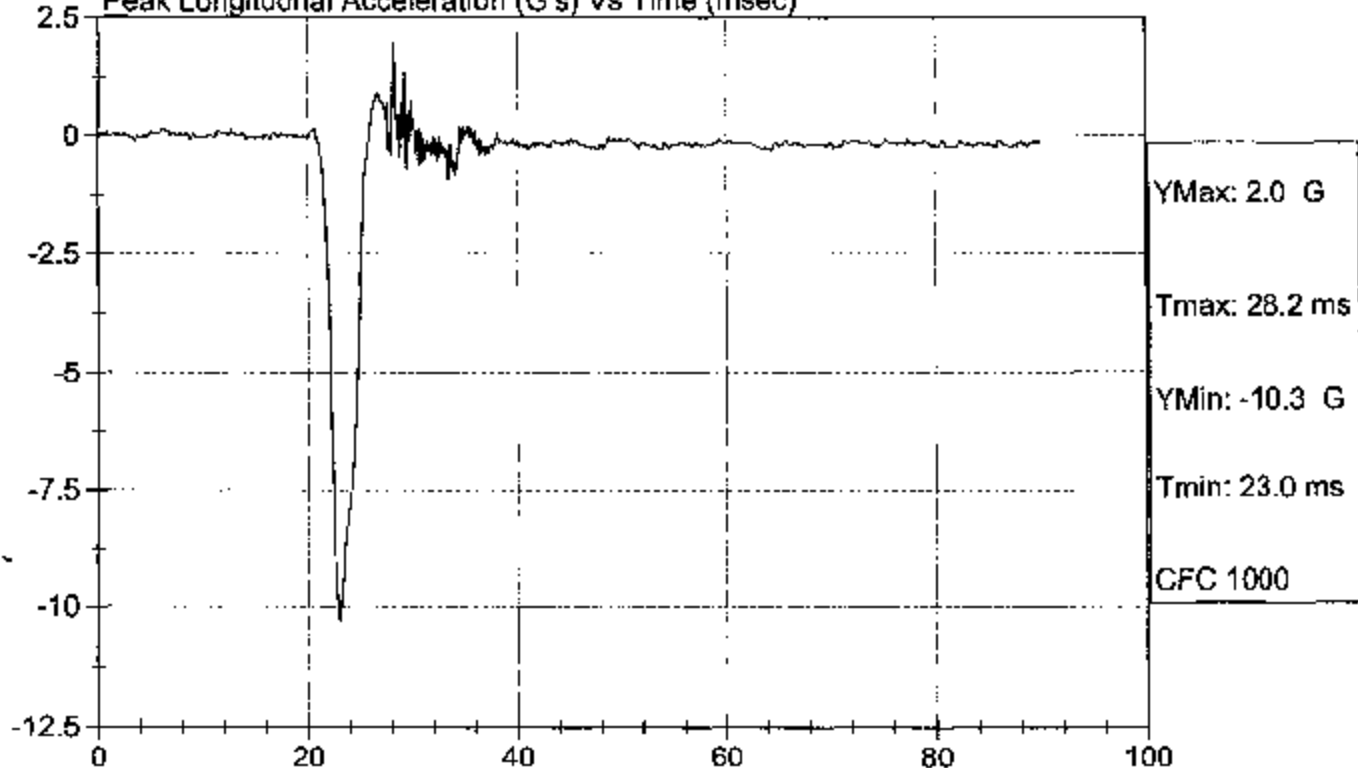
Component: D03551

Speed: 0 ft/s, 0.00 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



Peak Longitudnal Acceleration (G's) Vs Time (msec)



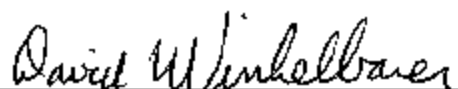
SID/HIII Calibration Data Sheet
Side Impact Dummy (SID)
Neck Pendulum Test

ATD Serial No: 037

Test I.D: D03559

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	21	Pass
Impact Velocity		m/s	6.89 to 7.13	7.00	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.28	Pass
	20 msec	m/s	4.12 to 5.10	4.45	Pass
	30 msec	m/s	5.73 to 7.01	6.28	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.00	Pass
Midsagittal Plane Max Rotation		deg	66 to 82	72	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	61	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	78	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	54	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	10	Pass


 Laboratory Technician


 Approved By

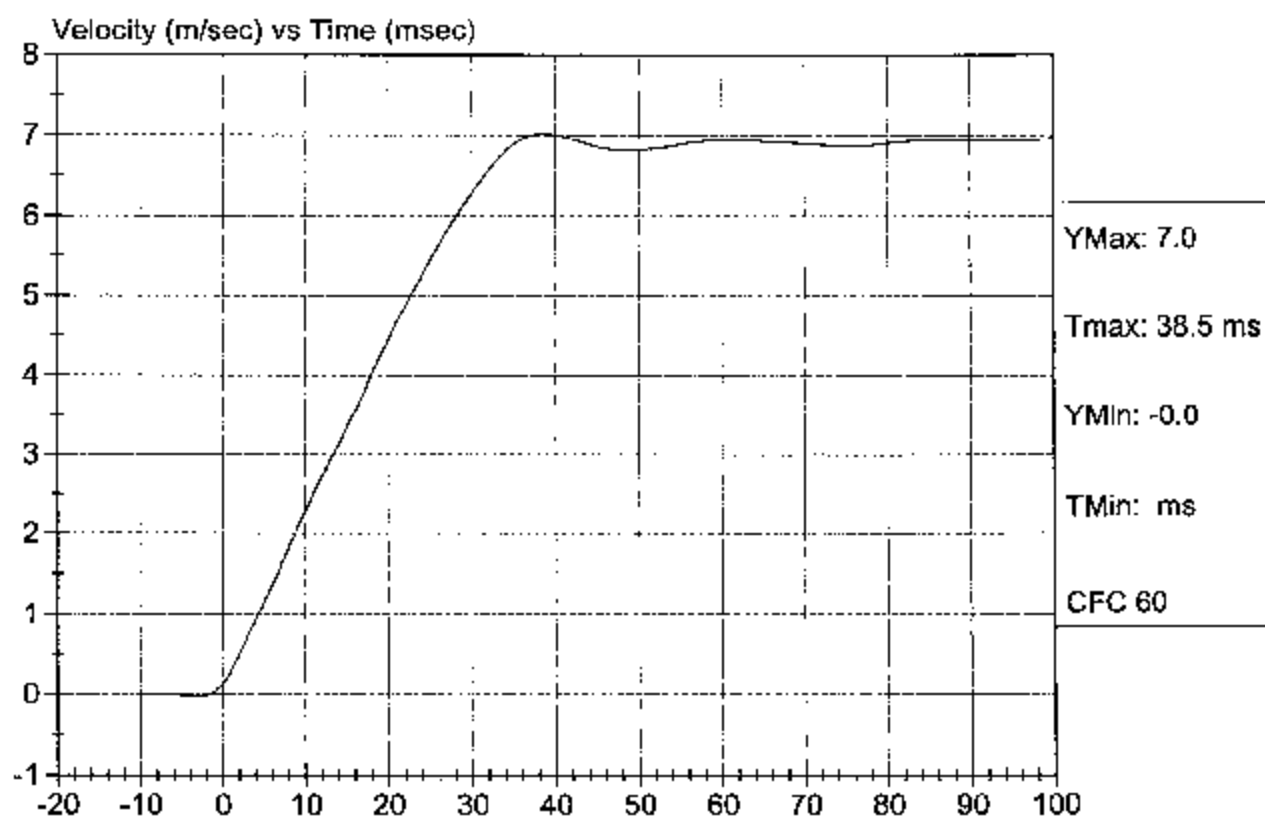
03/31/2003

Test Date



Test Desc: Neck Bending
Component ID: D03559

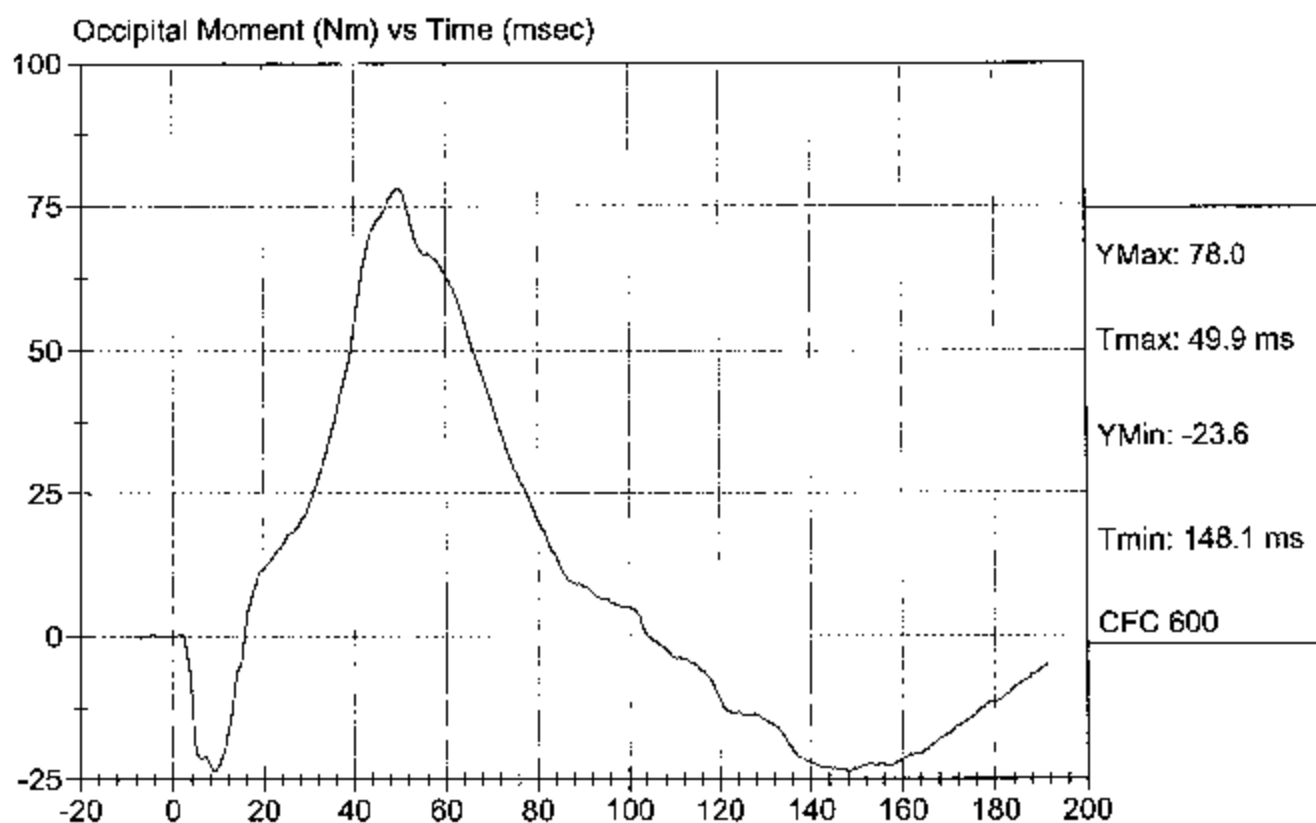
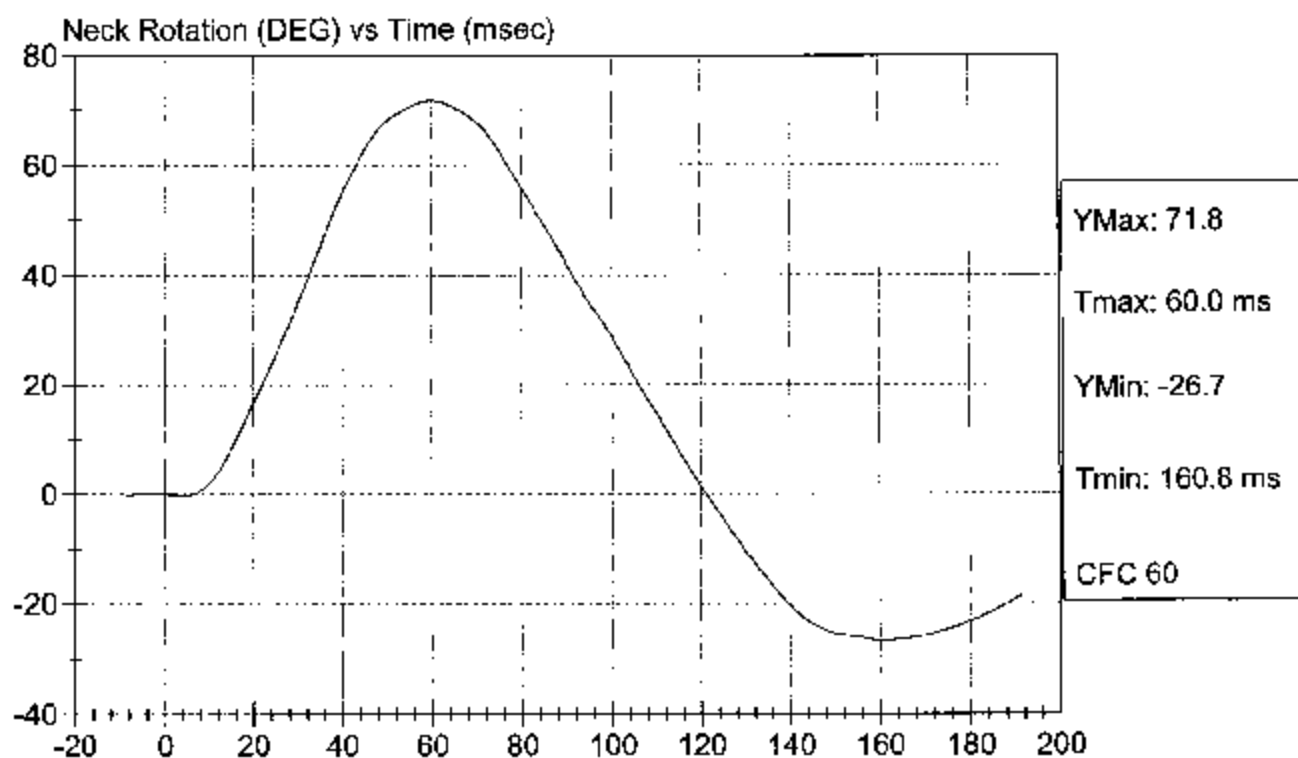
Test Date: 03/31/2003
Speed: 22.95 ft/sec, 7.00 m/sec





Test Desc: Neck Bending
Component ID: D03559

Test Date: 03/31/2003
Speed: 22.95 ft/sec, 7.00 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 037

Test I.D: D03552

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Probe Velocity	m/s	4.27 - 4.33	4.29	Pass
Upper Rib	G's	37 - 46	44	Pass
Lower Rib	G's	37 - 46	41	Pass
Lower Spine	G's	15 - 22	21	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

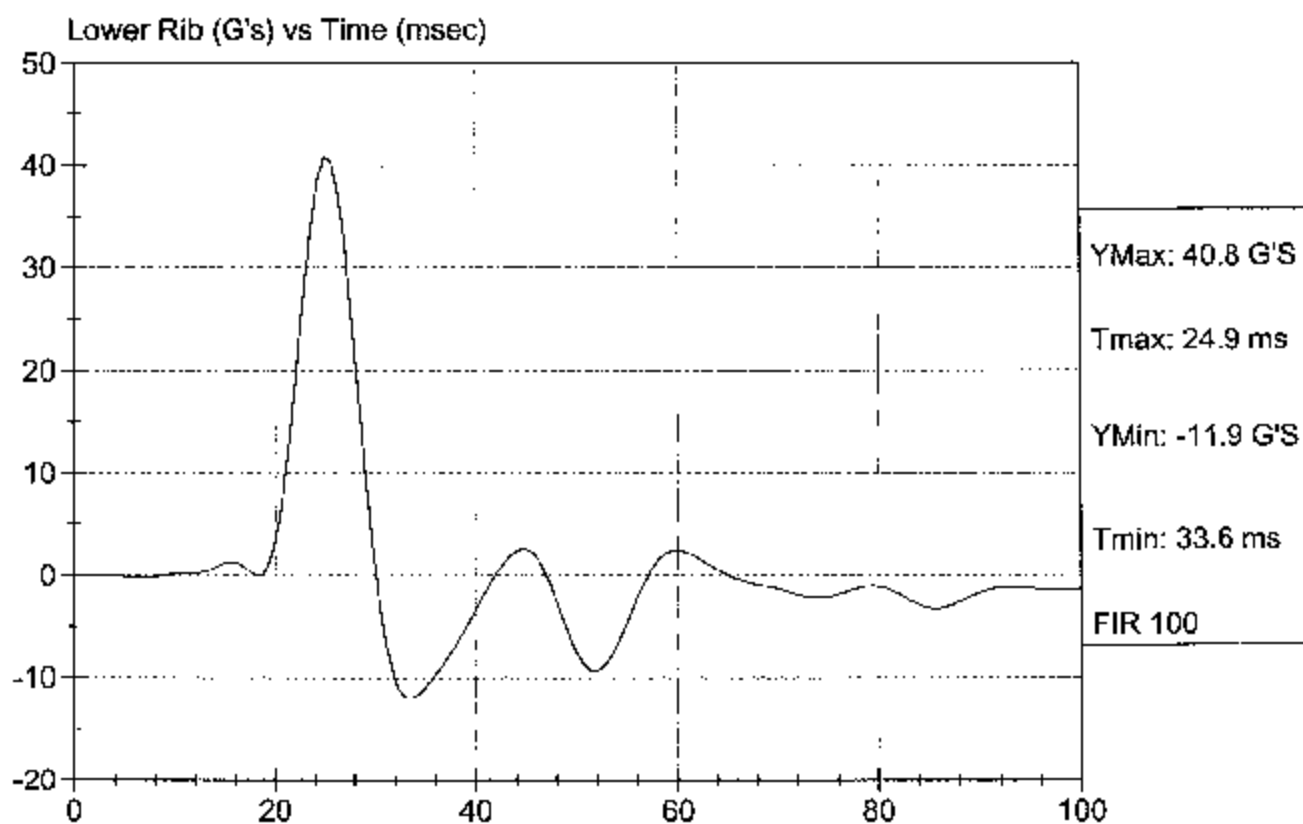
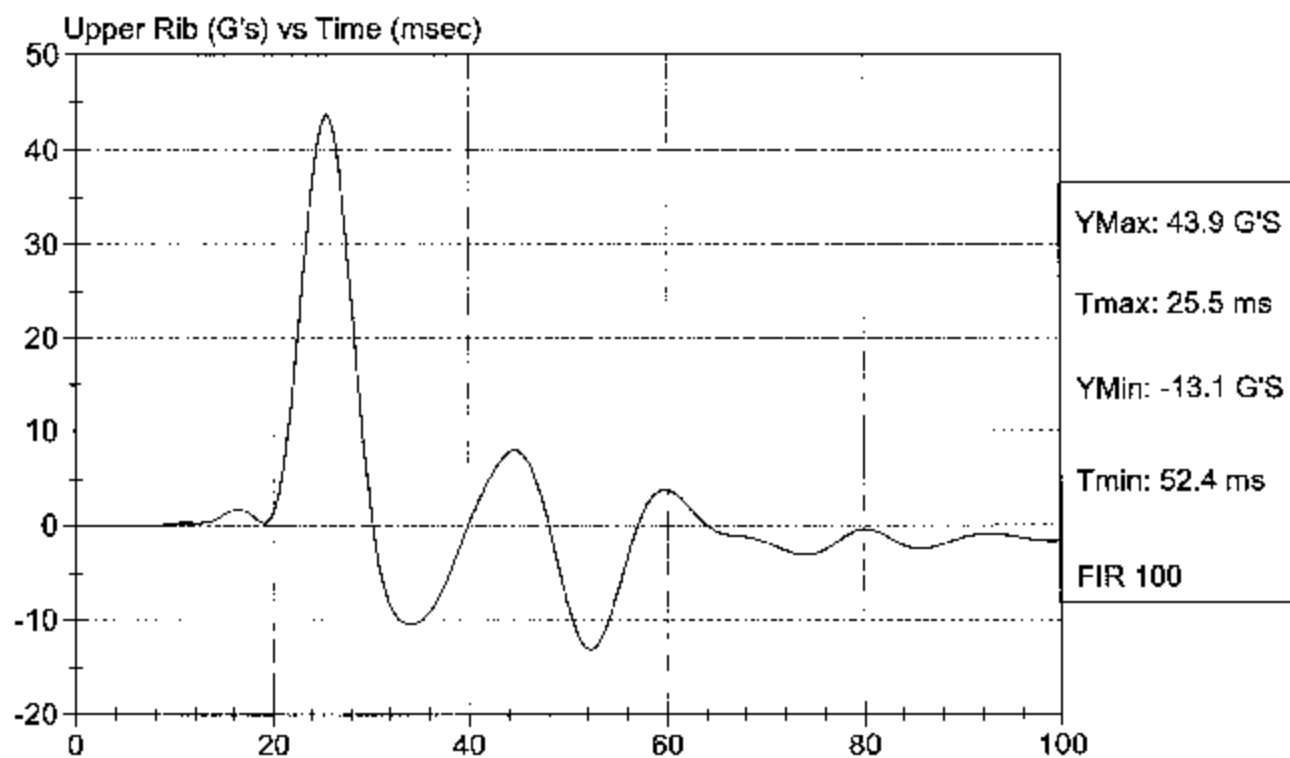
03/27/2003

Test Date



Test Desc: Thorax Impact
Component ID: D03552

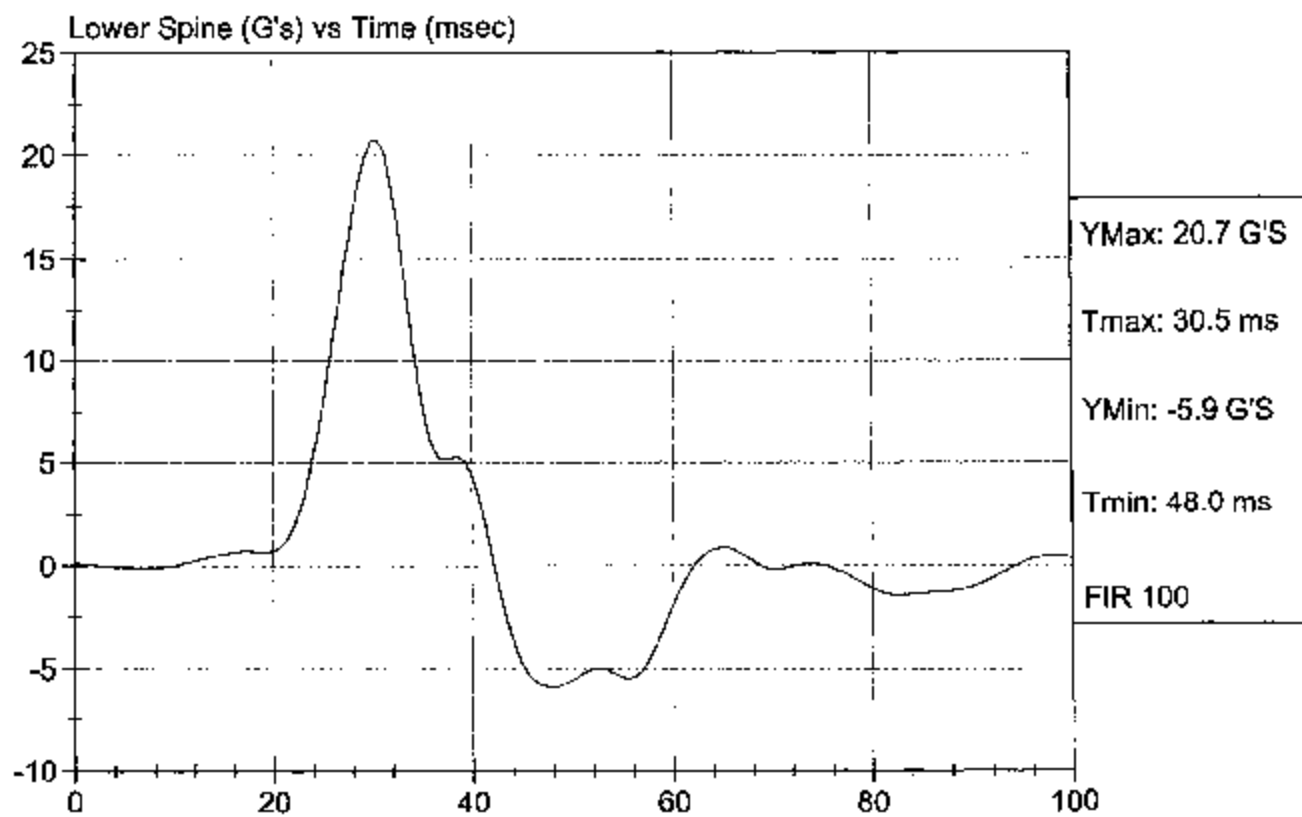
Test Date: 03/27/2003
Speed: 14.09 f/sec, 4.29 m/sec





Test Desc: Thorax Impact
Component ID: D03552

Test Date: 03/27/2003
Speed: 14.09 ft/sec, m/sec

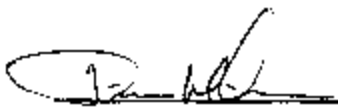


SID/HIII Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 037

Test I.D.: D03553

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	47	Pass
Overall Test Results				Pass


Laboratory Technician

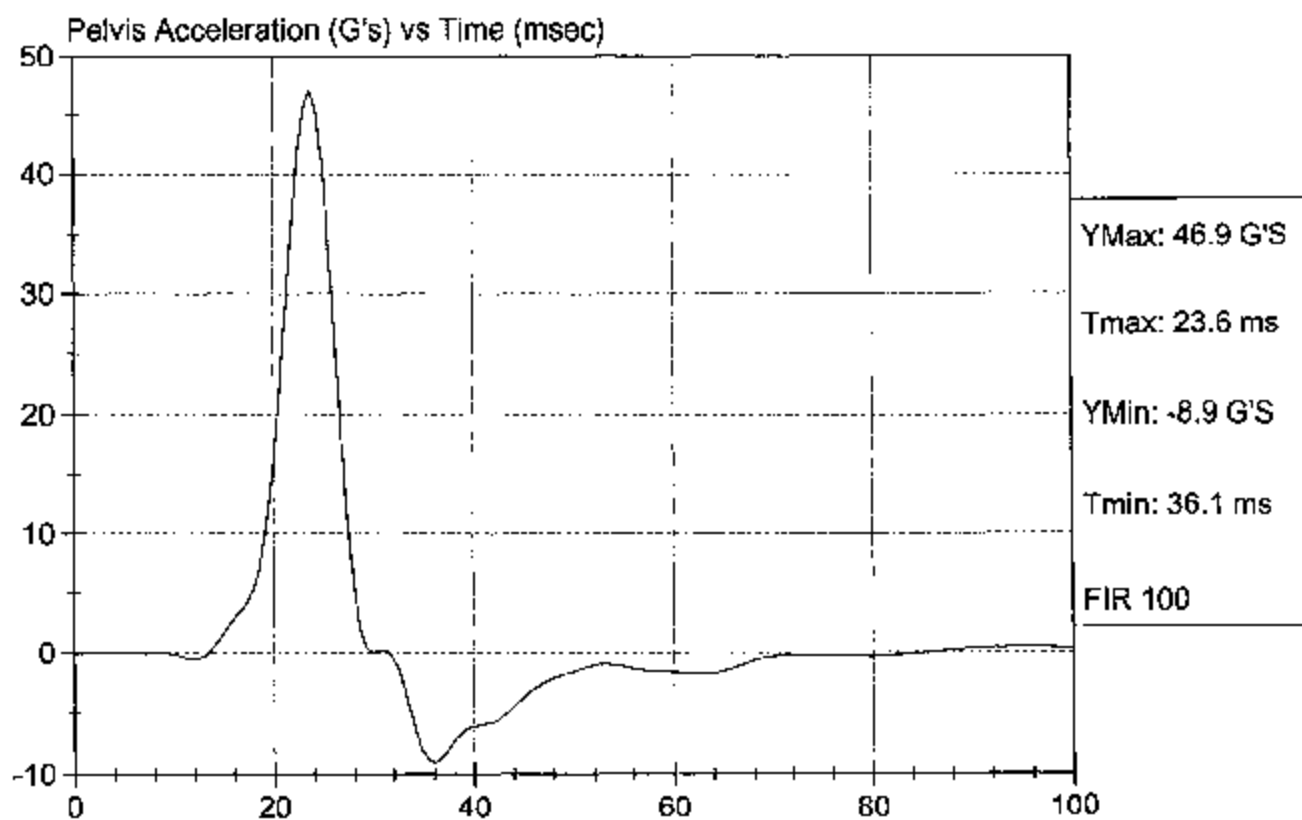

Approved By

03/27/2003
Test Date



Test Desc: Pelvis Impact
Component ID: D03553

Test Date: 03/27/2003
Speed: 14.11 ft/sec, 4.30 m/sec

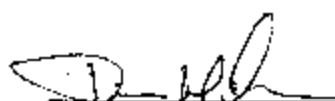


SID/HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 037

Test I.D: D03554

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Force At 12.7 mm	N	104 - 162	147	Pass
Force At 19 mm	N	163 - 222	200	Pass
Force At 25.4 mm	N	222 - 280	260	Pass
Force At 33 mm	N	325 - 391	348	Pass
Overall Test Results				Pass


 Laboratory Technician


 Approved By

03/28/2003

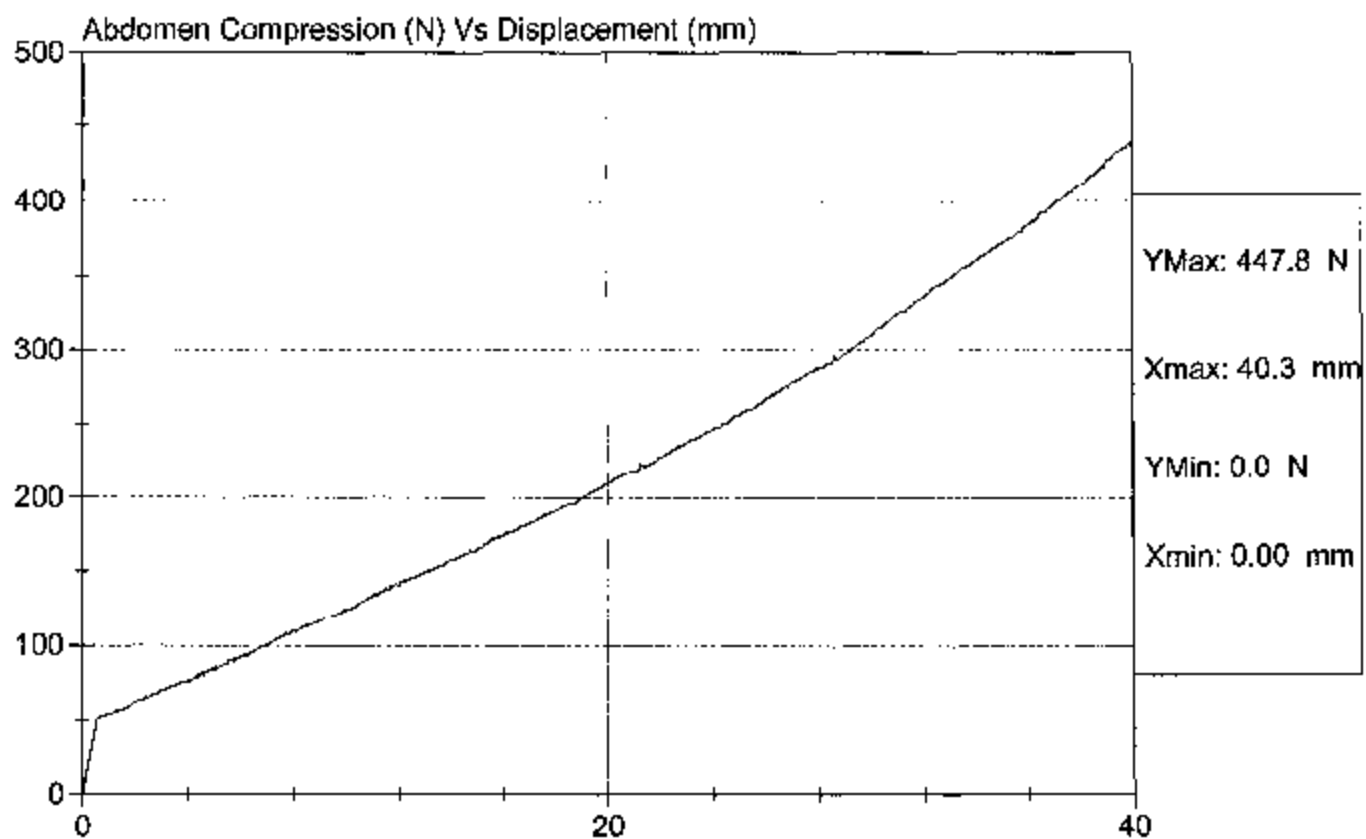
Test Date



Test Description: Abdomen Compression Test Date: 03/28/2003

Component: D03554

Speed: 0 ft/sec, 0 m/sec



SID/HII Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 037

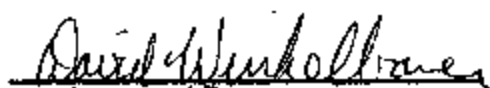
Test I.D.: D03555

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	113.4	Pass
Force At 30 deg	N	151.2 - 204.6	152.0	Pass
Force At 40 deg	N	204.6 - 258.0	222.8	Pass
Return Angle	Deg	12 Maximum	3	Pass
Overall Test Results				Pass


 Laboratory Technician

03/28/2003

Test Date


 Approved By

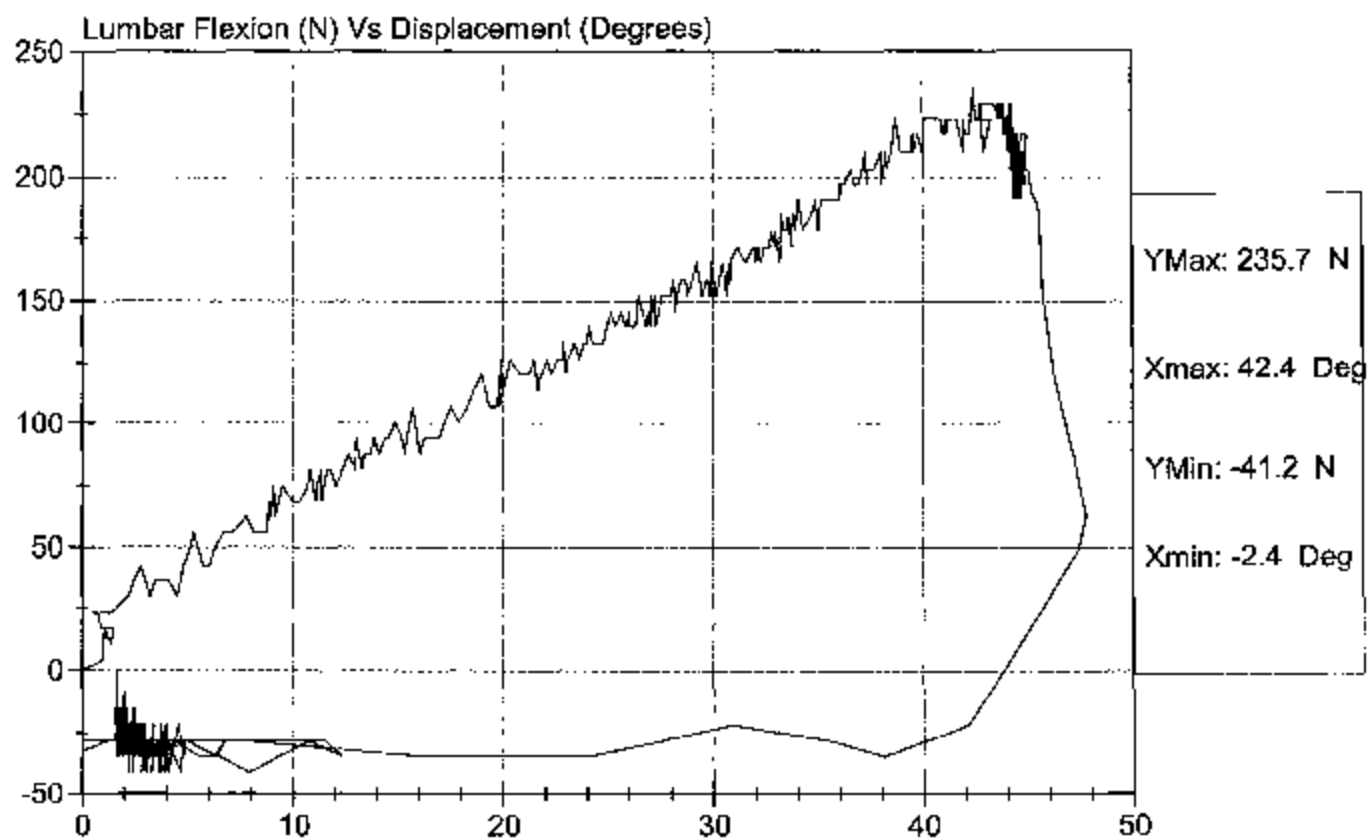


Test Description: Lumbar Flexion

Test Date: 03/28/2003

Component: D03555

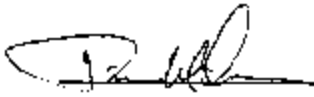
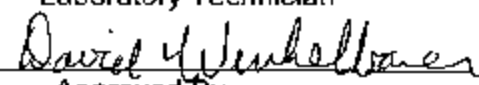
Speed: 0 ft/sec, 0 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 037

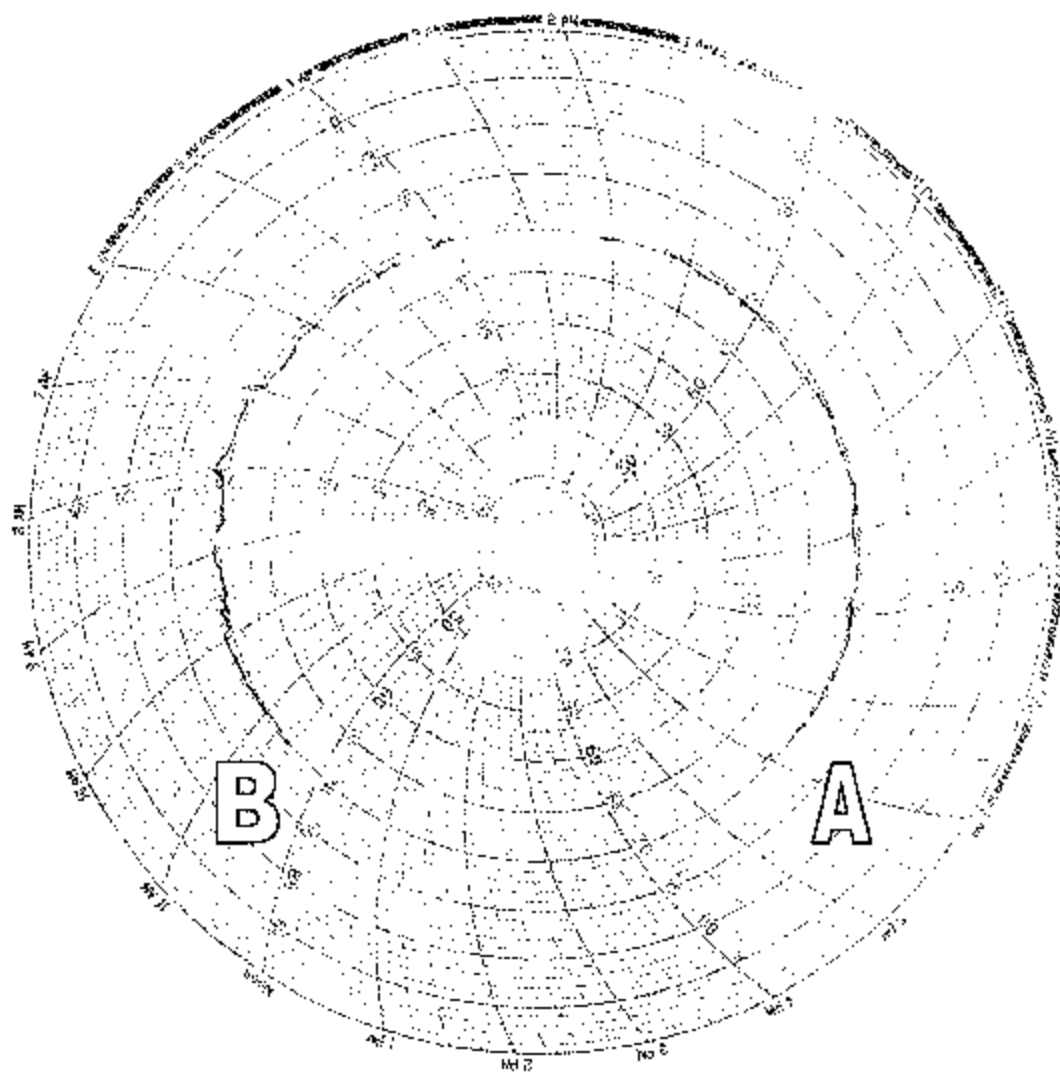
Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, accelerometer mount	Pass
Rib Cage	Visual, measure	Pass
Sternum	Visual	Pass
Lumbar Spine	Visual	Pass
Abdomen	Visual	Pass
Pelvis	Visual, palpate, accelerometer mount	Pass
Upper Legs	Visual	Pass
Knees	Visual	Pass
Lower Legs	Visual, range of motion	Pass
Ankles	Visual, range of motion	Pass
Feet	Visual, range of motion	Pass
Joints	1 to 2 g range	Pass
Other		Pass


 Laboratory Technician

 Approved By

03/28/2003

Test Date

Vehicle and Dummy Temperature



A = Dummies installed in vehicle at 7:00 a.m.

B = Test conducted at 11:30 a.m.

APPENDIX D

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA

	INSTRUMENTS FOR DRIVER 037		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head CG X	C10688	Endevco	3/10/03
Head CG Y	AGH74	Endevco	3/10/03
Head CG Z	C13046	Endevco	3/10/03
Neck Load Cell	376	Denton	12/9/02
Upper Rib Y	J23808	Endevco	1/15/03
Lower Rib Y	AHWP2	Endevco	1/15/03
Lower Spine Y	J13884	Endevco	11/19/02
Pelvis Y	AN8P9	Endevco	1/15/03
Upper Rib Redundant Y	AKAF3	Endevco	1/15/03
Lower Rib Redundant Y	AHY98	Endevco	1/15/03
Lower Spine Redundant Y	J14027	Endevco	11/19/02
Pelvis Redundant Y	AN8M6	Endevco	1/15/03

DUMMY AND VEHICLE CALIBRATION DATA (CONTINUED)

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Vehicle CG X	AK956	Entran	11/4/02
Vehicle CG Y	H02-J14	Entran	10/18/02
Vehicle CG Z	K11-J07	Entran	10/18/02
Left Floor Y	J10-E12	Entran	1/30/03
Left A-Post at Sill Y	G01-N02	Entran	2/24/03
Left Lower A-Post Y	K21-N26	Entran	2/24/03
Left Mid A-Post Y	ALFP5	Entran	11/4/02
Left B-Post at Sill Y	99F253	Entran	11/4/02
Driver Seat Track Y	G01-N09	Entran	2/24/03
Upper Engine X	G01-N06	Entran	2/24/03
Upper Engine Y	G01-N23	Entran	2/24/03
Firewall Y	A08-M02	Entran	2/24/03
Right Floor Y	K21-N06	Entran	1/16/03
Rear Deck X	A08-M04	Entran	2/24/03
Rear Deck Y	A08-M06	Entran	2/24/03
Left Front Door @ Rib Y	E10-F07	Entran	9/8/02
Left Front Door @ Pelvis Y	J07-X16	Entran	1/16/03
Left Front Door @ Knee Y	L23-A09	Entran	1/30/03

Note: Endevco accelerometers are Model No. 7264-2000 except Head accelerometers which are Model No. 7231C-750TS.
All Entran accelerometers are Model No. EGE-72